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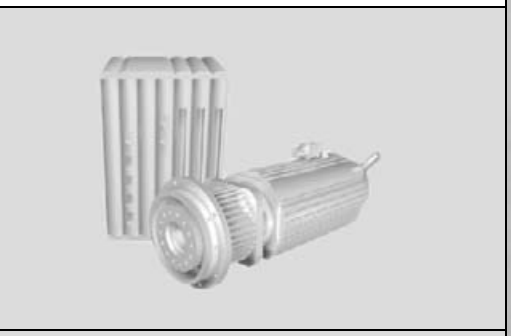

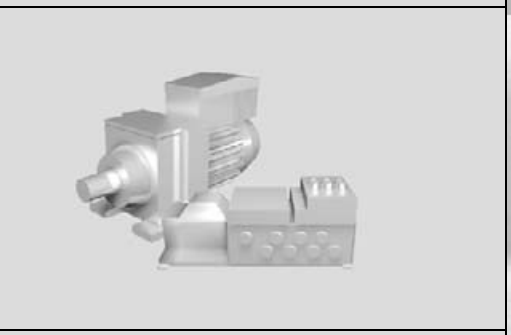

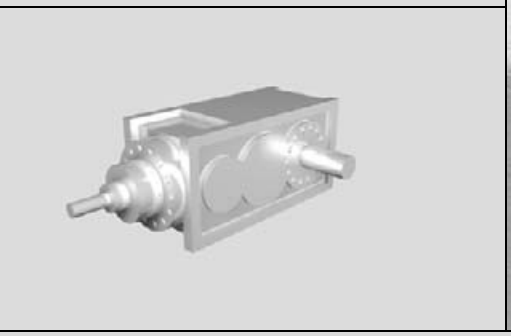

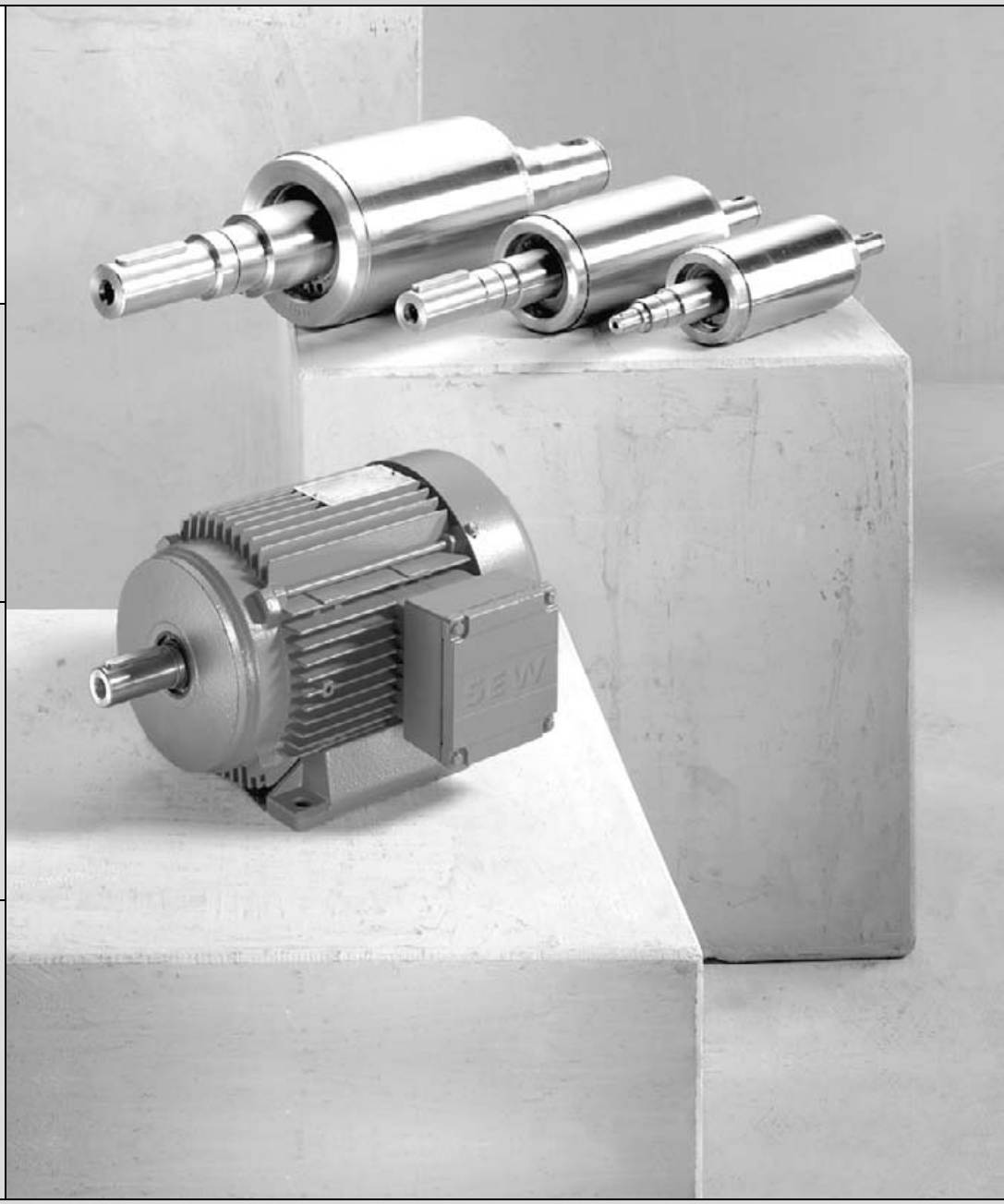

AC Motors DR/DV/DT/DTE/DVE, Asynchronous Servo Motors CT/CV

A6.C01

Edition 08/2004

11291613 / EN

Operating Instructions

SEW
EURODRIVE

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1 Important Notes

Safety and warning notes

Always follow the safety and warning instructions in these operating instructions!

Electrical hazard
Possible consequences: Severe or fatal injuries.

Hazard
Possible consequences: Severe or fatal injuries.

Hazardous situation
Possible consequences: Slight or minor injuries.

Harmful situation
Possible consequences: Damage to the drive and the environment.

Tips and useful information.

You must adhere to the operating instructions to ensure:

- Trouble-free operation
- Fulfillment of any rights to claim under limited warranty

Consequently, read the operating instructions before you start operating the drive!

The operating instructions contain important information about servicing. Therefore, keep the operating instructions close to the drive.

Waste disposal

Dispose of the following materials in accordance with the regulations in force:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic components

2 Safety Notes

Preface

The following safety notes are concerned with the use of motors. If using **gearmotors**, also refer to the safety notes for gear units in the corresponding operating instructions.

Please also consider the supplementary safety notes in the individual sections of these operating instructions.

General information

During and after operation, motors and gearmotors have live and moving parts and their surfaces may be hot.

All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair may only be performed by trained personnel observing

- The corresponding detailed operating instructions and wiring diagrams
- The warning and safety signs on the motor/gearmotor
- The specific regulations and requirements for the system
- The national / regional regulations governing safety and accident prevention

Severe injuries and damage to property may result from

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or the housing

Designated use

These electric motors are intended for industrial systems. They fulfill the applicable standards and regulations:

- Low voltage directive 73/23/EEC

Technical data and information about the permitted conditions can be found on the nameplate and in the documentation.

It is essential to observe all the specified information!

Transportation

Inspect the shipment for damage as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Tighten installed eyebolts. They are only designed for the weight of the motor/gearmotor; do not attach any additional loads.

The installed lifting eyebolts comply with DIN 580. Observe the loads and regulations specified in this standard. If the gearmotor is equipped with two suspension eye lugs or lifting eyebolts, then both of the suspension eye lugs should be used for transportation. In this case, the tension force vector of the slings must not exceed a 45° angle in accordance with DIN 580.

Use suitable, sufficiently rated handling equipment if necessary. Remove any transportation fixtures prior to startup.

Installation / assembly

Follow the instructions in the section "Mechanical Installation"!

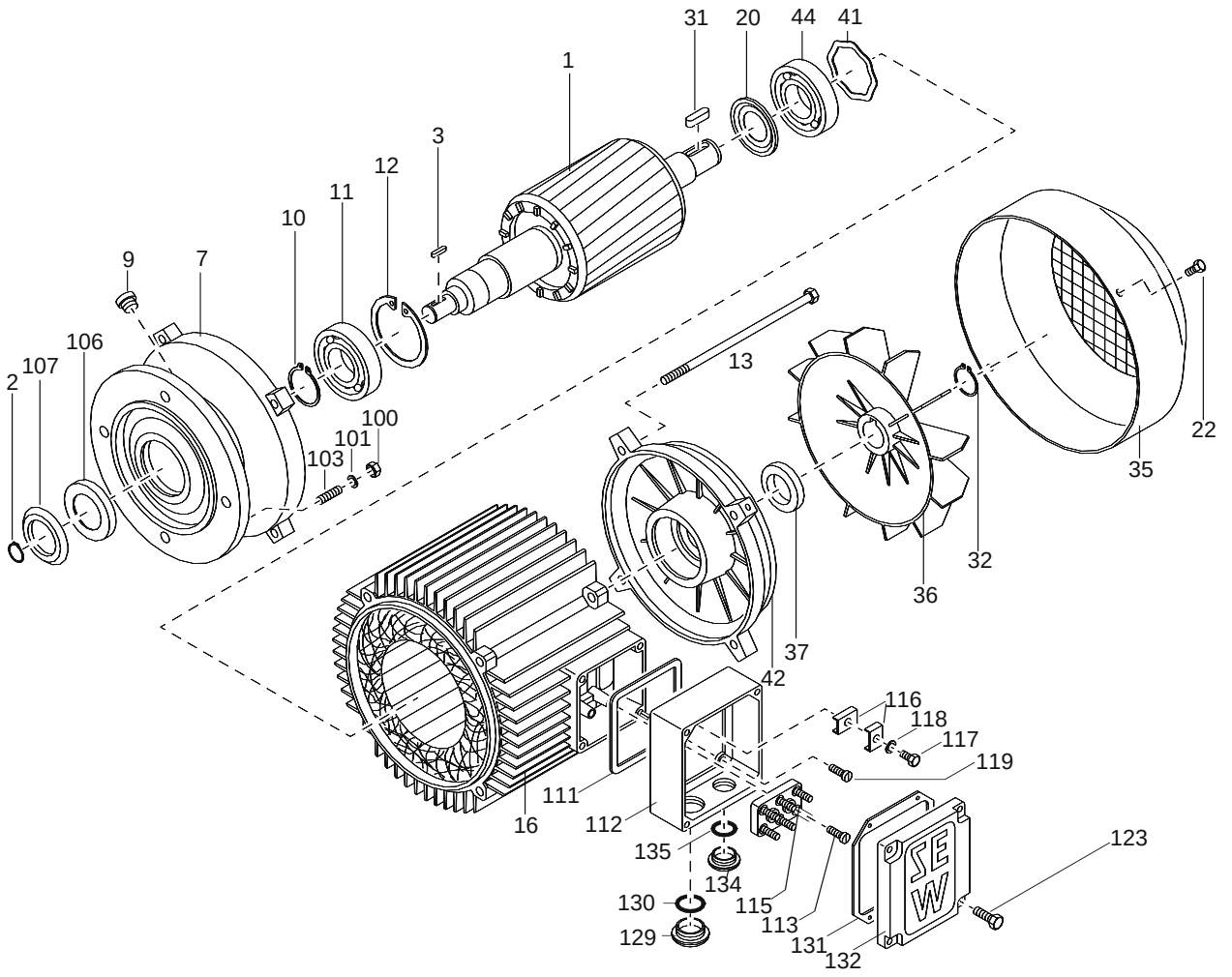
Inspection / maintenance

Follow the instructions in the section "Inspection and Maintenance"!

3 Motor Design

The following illustration is intended to explain the general structure. Its only purpose is to facilitate the assignment of components to the spare parts lists. Discrepancies are possible depending on the motor size and version!

3.1 Basic structure of AC motors

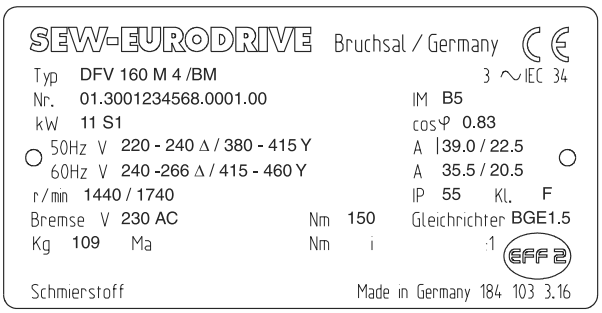


[1]	Rotor, cpl.	[31]	Key	[107]	Oil-flinger ring	[131]	Sealing washer
[2]	Circlip	[32]	Circlip	[111]	Gasket	[132]	Terminal box cover
[3]	Key	[35]	Fan guard	[112]	Terminal box lower part	[134]	Screw plug
[7]	Flanged end shield	[36]	Fan	[113]	Machine screw	[135]	Sealing washer
[9]	Screw plug	[37]	V-ring	[115]	Terminal board		
[10]	Circlip	[41]	Equalizing ring	[116]	Terminal yoke		
[11]	Grooved ball bearing	[42]	Non drive-end bearing shield	[117]	Hex head bolt		
[12]	Circlip	[44]	Grooved ball bearing	[118]	Lock washer		
[13]	Hex head screw (tie rod)	[100]	Hex nut	[119]	Machine screw		
[16]	Stator, cpl.	[101]	Lock washer	[123]	Hex head bolt		
[20]	Nilos ring	[103]	Stud	[129]	Screw plug		
[22]	Hex head bolt	[106]	Oil seal	[130]	Sealing washer		

3.2 Nameplate, unit designation

Nameplate

Example: DFV 160 M4 /BM brake motor



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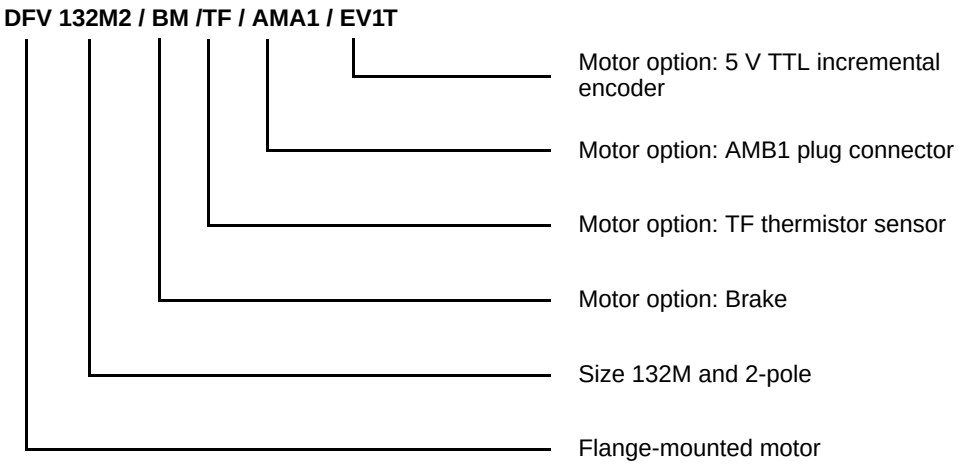
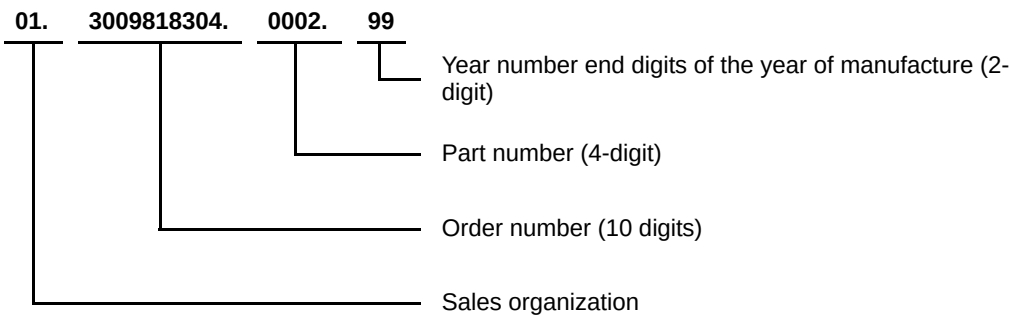
Unit designation

Example: DR / DT / DV / DTE / DVE AC (brake) motors

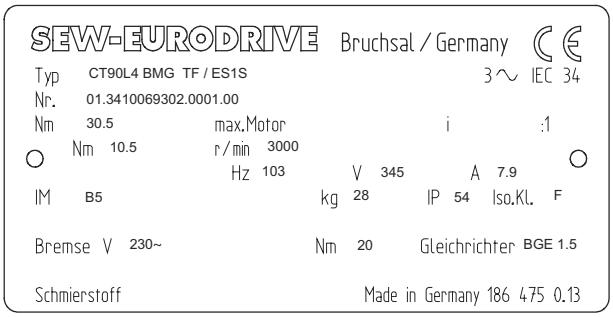

DFV 132M2 / BM /TF / AMA1 / EV1T
Motor option: 5 V TTL incremental encoder
Motor option: AMB1 plug connector
Motor option: TF thermistor sensor
Motor option: Brake
Size 132M and 2-pole
Flange-mounted motor

Example: Serial number



Nameplate

Example: CT90L4 / BMG / TF / ES1S servo brake motor



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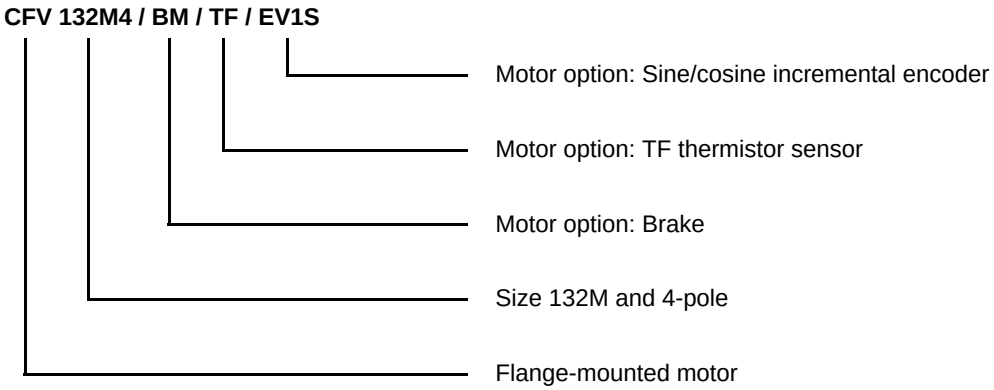
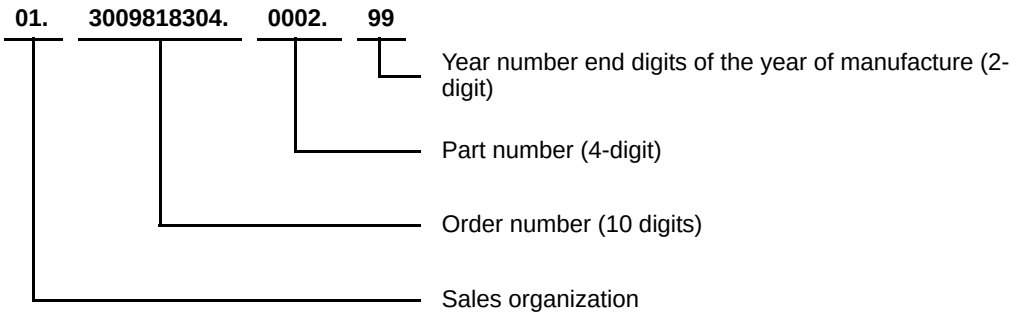
Unit designation

Examples: Servo (brake) motors CT / CV


CFV 132M4 / BM / TF / EV1S
Motor option: Sine/cosine incremental encoder
Motor option: TF thermistor sensor
Motor option: Brake
Size 132M and 4-pole
Flange-mounted motor

Example: Serial number



4 Mechanical Installation

It is essential to comply with the safety notes in Section 2 during installation!

4.1 Before you begin

The drive may only be installed if

- The entries on the nameplate of the drive and/or the output voltage of the frequency inverter match the voltage supply system
- The drive is undamaged (no damage caused by transportation or storage)
- It is certain that the following requirements have been met:
  - Ambient temperature between –20 °C and +40 °C[1)]
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level
  - Note the restrictions for encoders
  - Special versions: Drive configured in accordance with the ambient conditions

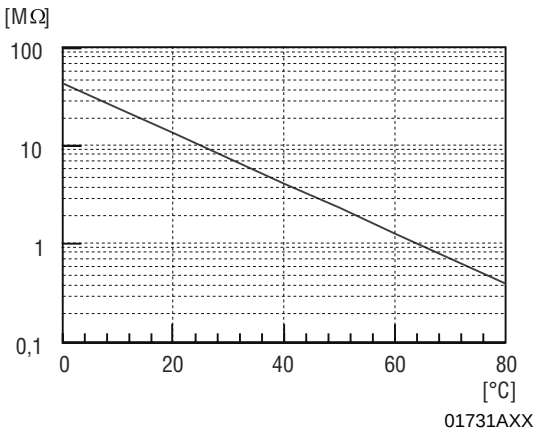
4.2 Preliminary work

Motor shaft ends must be thoroughly cleaned of anti-corrosion agents, contamination or similar (use a commercially available solvent). Do not allow the solvent to penetrate the bearings or shaft seals – this could cause material damage!

Extended storage of motors

- Please note the reduced grease utilization period of the ball bearings after storage periods exceeding one year.
- Check whether the motor has absorbed moisture as a result of being stored for a long time. Measure the insulation resistance to do this (measuring voltage 500 V).

The insulation resistance (→ following figure) varies greatly depending on the temperature! The motor must be dried if the insulation resistance is not adequate.

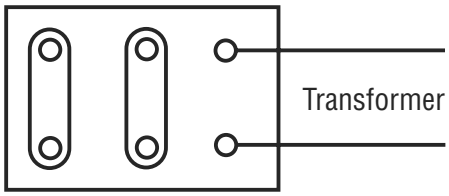


1) Minimum temperature for motors with backstop: –15 °C. Note that the temperature range of the gear unit may also be restricted (→ gear unit operating instructions)

Drying the motor

Heat up the motor

- with hot air or
- using an isolation transformer
  - Connect the windings in series (→ following figure)
  - Auxiliary AC voltage supply max. 10 % of the rated voltage with max. 20 % of the rated current



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The drying process is finished when the minimum insulation resistance has been attained.

Check the terminal box to see whether

- The inside is clean and dry
- The connections and fixing parts are free from corrosion
- The joint seals are OK
- The cable glands are sound, otherwise clean or replace them.

4.3 Installing the motor

The motor or gearmotor may only be mounted or installed in the specified mounting position on a level and torsionally rigid support structure which is not subjected to shocks.

Carefully align the motor and the driven machine to avoid placing any unacceptable strain on the output shafts (observe permissible overhung load and axial thrust data!).

Do not butt or hammer the shaft end.

Use an appropriate cover to protect motors in vertical mounting positions from objects or fluids entering (protection cowl C).

Ensure an unobstructed cooling air supply and that air heated by other apparatus cannot be drawn in or reused.

Balance components for subsequent mounting on the shaft with a half key (motor shafts are balanced with a half key).

Any condensation drain holes will be sealed by plastic plugs and should only be opened when necessary; open condensation drain holes are not permitted, as this would invalidate higher classes of enclosure.

If using brake motors with manual brake release, screw in either the hand lever (with self-reengaging manual brake release) or the setscrew (with lockable manual brake release).

Note the following for encoder mounting:

Foot-mounted motors CT/DT71, CT/DT90, CV/DV132M, CV/DV160L must be mounted on supports because the radius of the cover is greater than the shaft height.

For foot-mounted (brake) motors sizes DTE90L and DVE132M, the shaft height corresponds to the IEC standard motor of the next higher power level (100 mm or 160 mm). The foot dimensions of DTE90, DVE180, and DVE225 motors differ from the IEC dimensions; see Sec. "Dimension Sheet Notes" in the Gearmotors catalog.

Installation in damp locations or in the open

If possible, arrange the terminal box so the cable entries are pointing downwards.

Coat the threads of cable glands and pocket caps with sealant and tighten them well – then coat them again.

Seal the cable entry well.

Thoroughly clean the sealing surfaces of terminal boxes and terminal box covers prior to reassembly; gaskets must be glued in on one side. Install new gaskets to replace embrittled ones!

Restore the anticorrosive coating if necessary.

Check the enclosure.

4.4 Installation tolerances

Shaft end	Flanges
Diameter tolerance in accordance with DIN 748 • ISO k6 at Ø ≤ 50 mm • ISO m6 at Ø > 50 mm • Center bore in accordance with DIN 332, shape DR..	Centering shoulder tolerance in accordance with DIN 42948 • ISO j6 at Ø ≤ 230 mm • ISO h6 at Ø > 230 mm

5 Electrical Installation

It is essential to comply with the safety notes in section 2 during installation!

Switch contacts in utilization category AC-3 to EN 60947-4-1 must be used for switching the motor and the brake.

Using the wiring diagrams

The motor must only ever be connected as shown in the wiring diagram included with the motor. **Do not connect or start up the motor if this wiring diagram is missing.** You can obtain the valid wiring diagram free of charge from SEW-EURODRIVE.

5.1 Wiring notes

Comply with the safety notes during installation.

Protecting brake control systems against interference

Do not route brake cables alongside switched-mode power cables, as otherwise there is a risk of disrupting brake control systems.

Switched-mode power cables include in particular:

- Output cables from frequency and servo controllers, converters, soft start units and brake units
- Feeder cables for brake resistors and similar options

Protecting motor protection devices against interference

To protect SEW motor protection devices (temperature sensors TF, winding thermostats TH) against interference:

- Route separately shielded feeder cables together with switched-mode power lines in one cable
- Do not route unshielded feeder cables together with switched-mode power lines in one cable

5.2 Special aspects for operation with a frequency inverter

When motors are powered from inverters, you must adhere to the wiring instructions issued by the inverter manufacturer. It is essential to observe the operating instructions for the frequency inverter.

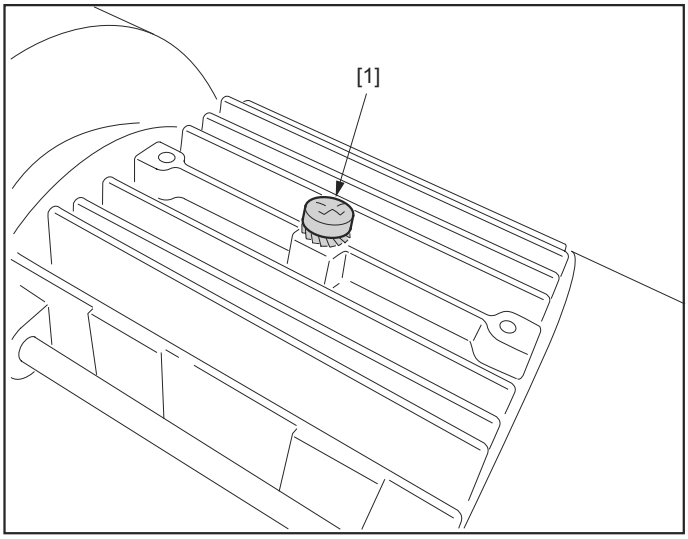
5.3 Special aspects of single-phase motors

Bear in mind that SEW single-phase motors are supplied without accessory equipment such as capacitors, starting relays or centrifugal switches (exception: ET56L4 → Sec. "Single-phase version ET56"). Any parts you need must be obtained from your dealer and connected according to the corresponding instructions and wiring diagrams.

5.4 Improving the grounding (EMC)

For improved, low-impedance grounding at high frequencies, we recommend using the following connections with the DR/DV/DT AC motors:

- Sizes DT71 ... DV 132S: [1] M5x10 thread rolling screw and 2 serrated lock washers to DIN 6798 in the stator housing.



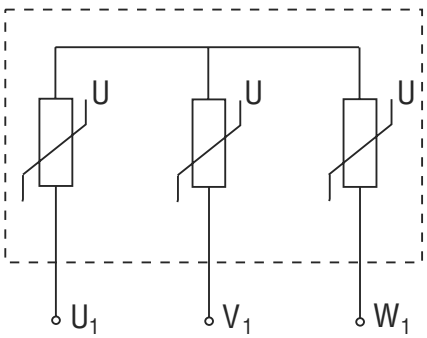
- Sizes DV112M ... DV280: Screw and 2 serrated lock washers in the bore of the eye bolt.

  Thread size of the eye bolt:

  – DV112 / 132S: M8
  – DV132M ... 180L: M12
  – DV200 ... 280: M16

5.5 Special aspects of torque motors and low-speed motors

Due to the design of torque motors and low-speed motors, very high induction voltages may be generated when they are switched off. Consequently, SEW-EURODRIVE recommends using the varistor circuit shown below for protection. The size of the varistors depends, amongst other factors, on the starting frequency – note for project planning!



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5.6 Special aspects in switching operation

When the motors are used in switching operation, possible interference of the switchgear must be excluded by ensuring suitable wiring. According to EN 60204 (electrical equipment of machines), motor windings must have interference suppression to protect the numerical or programmable logic controllers. As it is primarily switching operations that cause interference, SEW-EURODRIVE recommends installing protective circuitry in the switching devices.

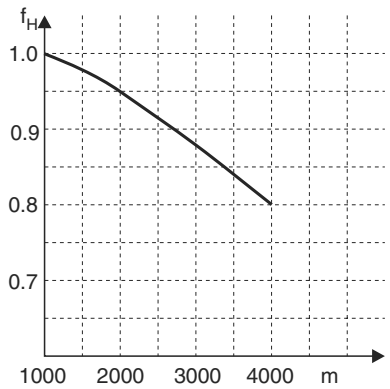
5.7 Environmental conditions during operation

Ambient temperature

The temperature range of -20 °C to +40 °C must be ensured unless specified otherwise on the nameplate. Motors intended for use in higher or lower ambient temperatures have the appropriate designation on the nameplate.

Altitude

The maximum installation altitude of 1000 m above sea level must not be exceeded as otherwise this causes a derating as specified in the following diagram.



Hazardous radiation

Motors must not be subjected to hazardous radiation. Contact SEW-EURODRIVE if necessary.

5.8 Connecting the motor

In case of operation with electronic control units, it is essential to adhere to the corresponding operating instructions / wiring diagrams!

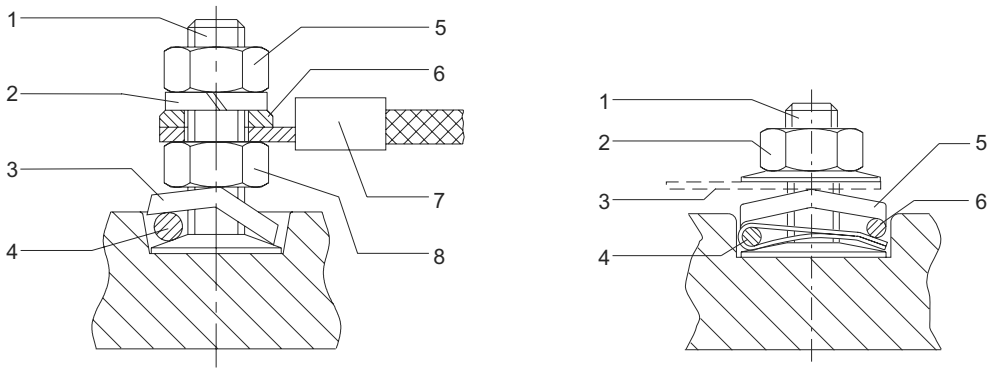
Connecting the motor via terminal boxes

- According to the circuit diagram provided
- Check the line cross section
- Arrange terminal links correctly
- Screw connections and protective earth conductors on firmly
- In terminal boxes: Check winding connections and tighten them if necessary

Small connection accessories

Note: In the case of motor sizes DR63 - DV132S, the small connection accessories (connection nuts for feeder cables, terminal links, lock washer and washers) are supplied in a bag. Depending on the type of terminal board, install the parts in accordance with the figure below. In the connection type shown on the right in the figure below, the second retaining nut, the lock washer and the washer are not used. The external connection [6] can be installed directly or as a lug [4] below the connection disk [5]. The tightening torque of the hex net in the figure on the right is:

- 1.6 Nm ± 20 % for M4
- 2 Nm ± 20 % for M5



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1 Terminal stud
2 Lock washer
3 Connection disk
4 Motor terminal lead
5 Top nut
6 Washer
7 External connection
8 Bottom nut

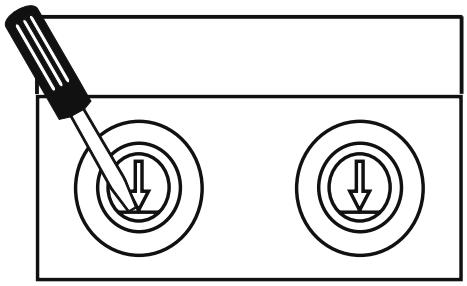
1 Terminal stud
2 Hex nut with flange
3 Terminal link
4 Motor connection with Stocko connection
5 terminal
6 Connection disk
External connection

The asynchronous servomotors of the CT/CV series are supplied with connected terminal links according to the nameplate.

5.9 Preparing motor sizes 56 and 63 – knockout

Important: Wear safety glasses – danger of injury from fragments!

- Put on the terminal box cover and screw it into place
- Define which cable entries to open
- Open the cable entries
  - with a chisel or similar (hold at an angle)
  - by a light tap with a hammer



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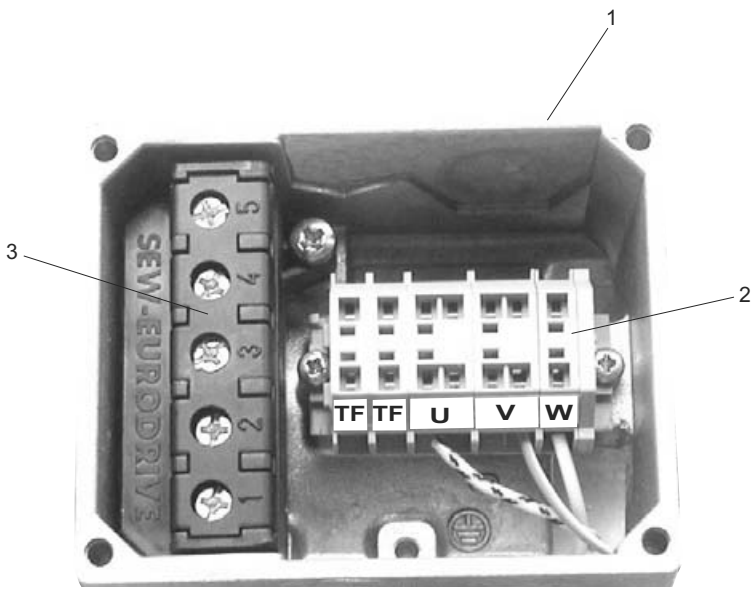
Caution – Do not knock through into the inside of the terminal box!

- Open the terminal box, remove the knockout cover if it has broken off
- Secure the cable screw fittings with the supplied lock nuts

5.10 Connecting DT56 motor...+/BMG

The motor has a star point with three fixed connection points in the winding overhang. The supply system leads (L1, L2, L3) are connected to a spring cage terminal block [2] in the terminal box [1]. The BMG02 brake is controlled using the BG1.2 brake rectifier [3]. As an alternative, the brake can be controlled from the switch cabinet using BM series rectifiers.



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5.11 Single-phase version ET56

The ET56 single-phase motor is supplied with a running capacitor that is mounted and connected:

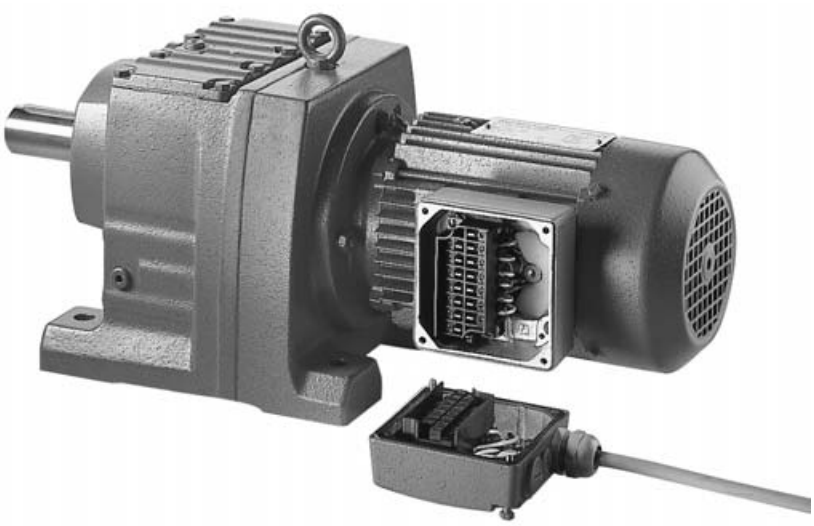
1~230 V, 50 Hz C_B = 4 µF

1~230 V, 60 Hz C_B = 4 µF

1~110 V, 60 Hz C_B = 20 µF

No full-load startup is possible with the running capacitor alone! The single-phase motor cannot be combined with a TF.

5.12 Connecting the motor using the IS plug connector



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The IS plug connector is supplied from the factory with its base fully wired-up, including additional features such as a brake rectifier. The upper section of the IS connector is included in the scope of delivery and must be connected as shown in the wiring diagram.

The IS plug connector has CSA approval up to 600 V. Note for application according to CSA regulations: Tighten the M3 terminal screws to a torque of 0.5 Nm! See the following table for American Wire Gauge (AWG) line cross sections!

Line cross section

Make sure the type of line corresponds to the applicable regulations. The rated currents are specified on the motor nameplate. The line cross sections that can be used are listed in the following table.

Without variable terminal link	With variable terminal link	Link cable	Double assignment (Motor and brake/SR)
0.25 - 4.0 mm^2	0.25 - 2.5 mm^2	max. 1.5 mm^2	max. 1 x 2.5 and 1 x 1.5 mm^2
23 - 12 # AWG	23 - 14 # AWG	max. 16 # AWG	max. 1 x 14 # and 1 x 16 # AWG

Wiring the upper section of the plug connection

- Loosen the housing cover screws
  - Remove the housing cover
- Remove the screws from the upper section of the plug connector
  - Remove the upper section of the plug connector from the cover
- Strip the insulation off the connection lead
  - Strip about 9 mm insulation off the connecting leads
- Pass the cable through the cable gland

Wiring up as shown in circuit diagram DT82, DT83

- Connect the lines as shown in the circuit diagram
  - Tighten the clamping screws carefully!
- Install the plug connector (→ Sec. "Installing the plug connector")

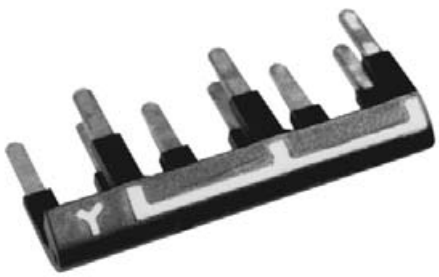
Wiring up as shown in wiring diagram DT81

For ⅄ / △ startup:

- Connect with 6 lines
  - Tighten the clamping screws carefully!
  - Motor contactors in the switch cabinet
- Install the plug connector (→ Sec. "Installing the plug connector")

For ⅄ or △ operation:

- Connect as shown in the wiring diagram
- Install the variable terminal link as shown in the following figures according to the required motor operation (△ or ⅄)
- Install the plug connector (→ Sec. "Installing the plug connector")



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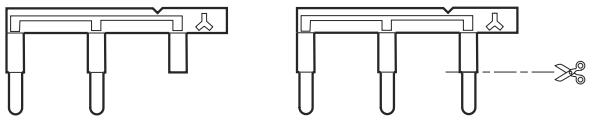
Brake control system BSR – preparing the variable terminal link

For ⅄ operation:

On the ⅄ side of the variable terminal link as shown in the following figure: Remove only the bare metal pin of the marked prong horizontally – touch guard!



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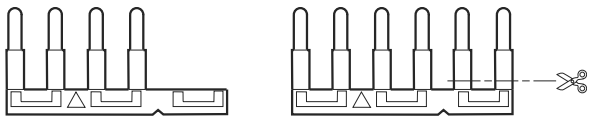
For △ operation:

On the △ side of the variable terminal link as shown in the following figure: Completely remove two prongs horizontally.



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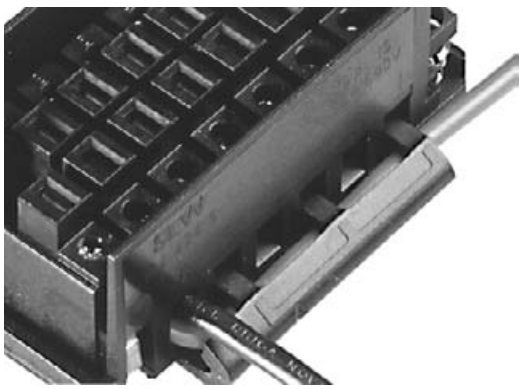
Wiring according to the DT81 wiring diagram for ⅄ or △ operation with double terminal assignment

- At terminal point for double assignment:
  - Connect the link cable
- When operation is as required:
  - Insert the link cable in the variable terminal link
- Install the variable terminal link
- At terminal point for double assignment:
  - Connect the motor lead above the variable terminal link
- Connect the other lines as shown in the wiring diagram.
- Install the plug connector (→ Sec. "Installing the plug connector")



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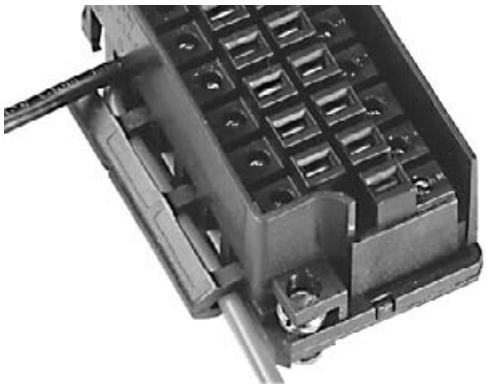
Installing the plug connector

The housing cover of the IS plug connector can be screwed onto the lower section of the plug connector depending on the required position of the cable lead. The upper section of the plug connector shown in the following figure must first be installed in the housing cover so it will match the position of the lower section of the plug connector:

- Define the required mounting position
- Install the upper section of the plug connector into the housing cover in accordance with the mounting position
- Close the plug connector
- Tighten the cable gland



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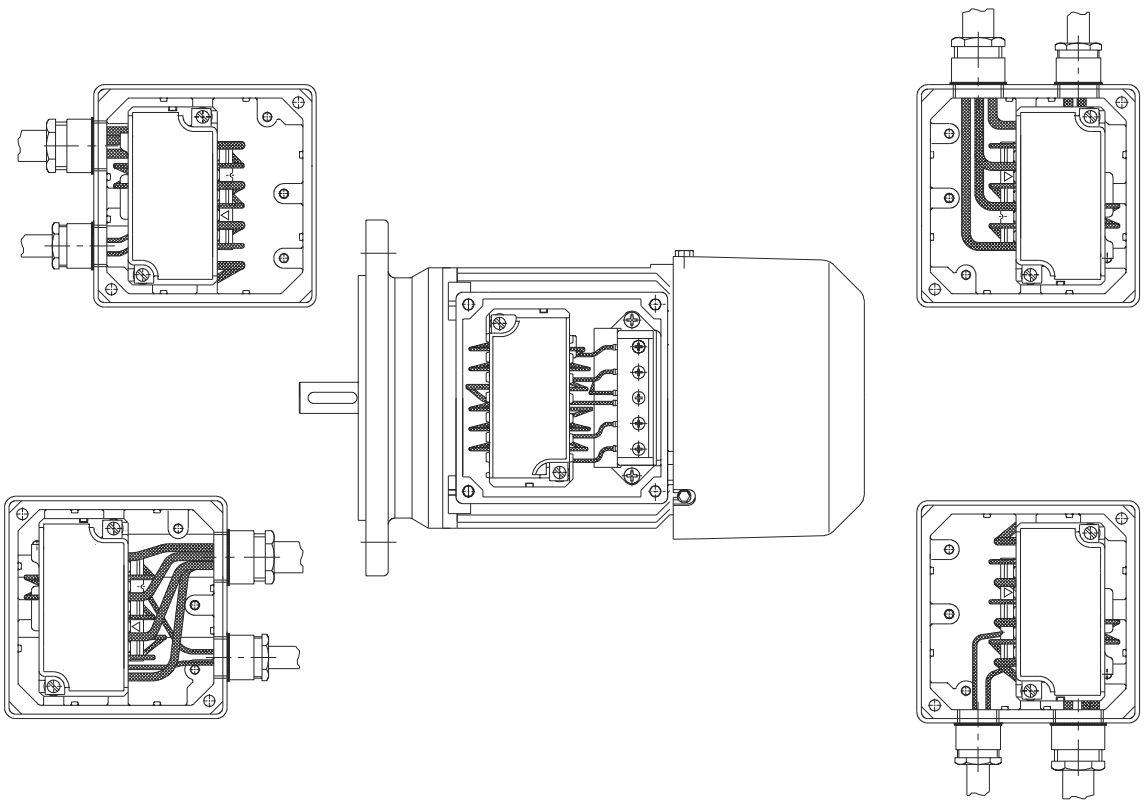
Mounting position of the upper section of the plug connection in the housing cover



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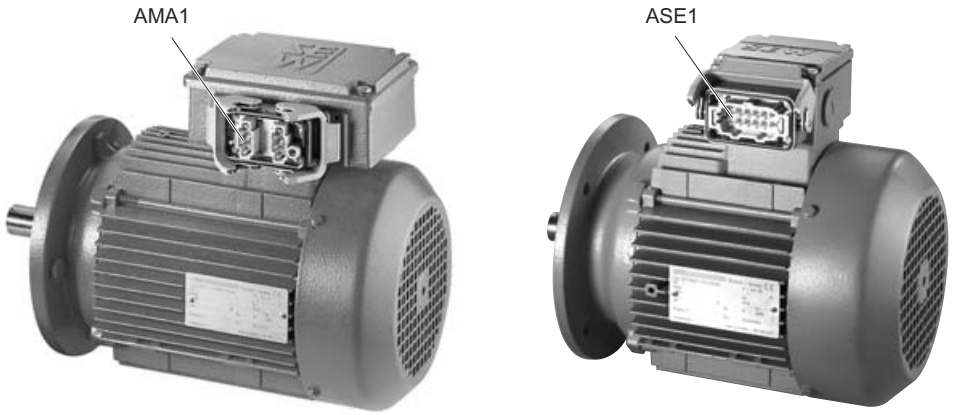
5.13 Connect the motor using plug connectors AB.., AD.., AM.., AS



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The installed plug connector systems AB.., AD.., AM.., AC.. and AS.. are based on the plug connector systems made by Harting.

- AB.., AD.., AM.. → Han Modular®
- AC.., AS.. → Han 10E / 10ES

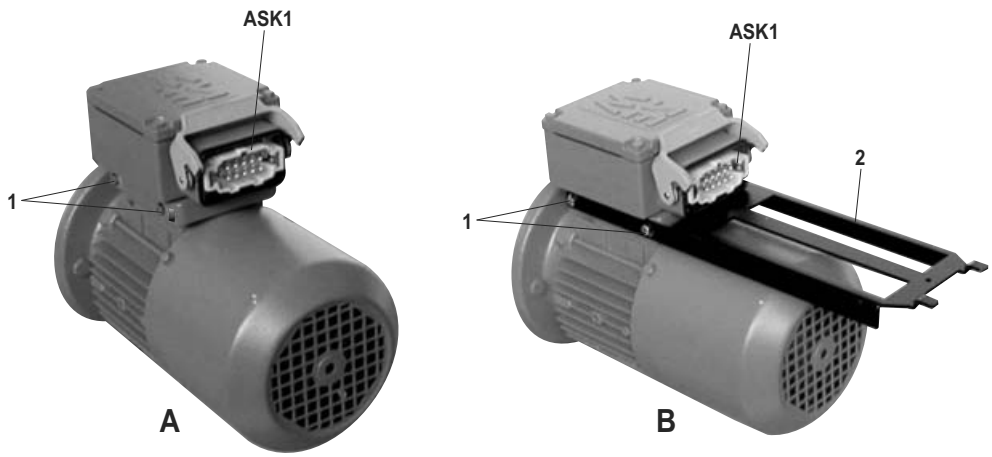
The plugs are mounted on the side of the terminal box. They are locked either using two clamps or one clamp on the terminal box.

UL approval has been granted for the plug connectors.

The mating connectors (sleeve housing) with contact tubes are not included in the scope of delivery.

The enclosure is only applied when the mating connector is mounted and locked.

5.14 Connecting the motor using ASK1 plug connector



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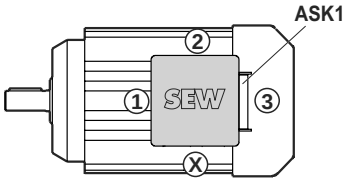
Drives with ASK1 plug connectors are certified according to the ECOFAST specification (version 1.1). Switchgear or control units which also have to be certified can be connected to SEW-EURODRIVE motors using a pre-fabricated system cable or a carrier plate (installation integrated in the motor → Fig. B). The ASK1 plug connector with single-clip locking is mounted on the side of the terminal box and is supplied from the

factory fully wired up, including additional features such as a brake rectifier.

- **The customer must obtain the system cable pre-fabricated according to the ECOFAST specification from a specialist retailer.**
- **For installation integrated in the motor according to the ECOFAST specification, the customer must obtain the carrier plate from SEW-EURODRIVE by quoting part number 0187 390 3. Carrier plates from other manufacturers do not fit on SEW-EURODRIVE motors.**

Position of the plug connector

Possible positions of the ASK1 plug connector are "X" (= normal position), "1", "2" or "3". Unless specified otherwise, the unit is supplied with the plug connector in position "3". For installation integrated in the motor (using the carrier plate), units are exclusively supplied with the plug connector in position "3".



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Installing the carrier plate

- Unscrew and remove four retaining screws [1] below the terminal box (→ Fig. A)
- Place the carrier plate [2] against the holes for the retaining screws and install it by screwing in the four retaining screws [1] (→ Fig. B).

5.15 Connecting the brake

The brake is released electrically. The brake is applied mechanically when the voltage is switched off.

Comply with the applicable regulations issued by the relevant employer's liability insurance association regarding phase failure protection and the associated circuit/circuit modification!

- Connect the brake according to the wiring diagram supplied with the brake.
- **Note:**In view of the DC voltage to be switched and the high level of current load, it is essential to use either special brake contactors or AC contactors with contacts in utilization category AC-3 to EN 60947-4-1.
- Attach one of the following options for the version with manual brake release
  - Hand lever (for self-reengaging manual brake release)
  - Setscrew (for locking manual brake release)
- After replacing the brake disc, the maximum braking torque is reached only after several cycles.

Connecting the brake control system

The DC disk brake is powered from a brake control system with a protection circuit. It is located in the terminal box / IS lower part or must be installed in the switch cabinet (→ Sec. "Wiring notes").

- **Check the line cross sections - braking currents (→ Sec. "Technical Data")**
- Connect the brake control system according to the wiring diagram supplied with the brake
- For motors in thermal class H, install the brake rectifier in the switch cabinet!

5.16 Accessory equipment

Connect supplied accessory equipment according to the wiring diagrams included.

TF temperature sensor

Do not apply voltage!

The positive temperature coefficient (PTC) thermistors comply with DIN 44082.

Resistance measurement (measuring instrument with V ≤ 2.5 V or I < 1 mA):

- Standard measured values: 20...500 Ω, thermal resistance > 4000 Ω
- Measured values pole-changing with separate winding: 40...1000 Ω,
  Thermal resistance > 4000 Ω

When using the temperature sensor for thermal monitoring, the evaluation function must be activated to maintain reliable isolation of the temperature sensor circuit. If the temperature reaches an excessive level, the thermal protection function must be effective immediately.

TH winding thermostats

The thermostats are connected in series as standard and open when the permitted winding temperature is exceeded. They can be connected in the drive monitoring loop.

	V_{AC}		V_{DC}	
Voltage U [V]	250	400	60	24
Current (cos φ = 1.0) [A]	2.5	0.75	1.0	1.6
Current (cos φ = 0.6) [A]	1.6	0.5		
Contact resistance max. 1 ohm at 5 V = / 1 mA				

Forced cooling fan

Motor sizes 71 - 132S

VS system

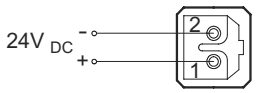
- 1 x 230 V_{AC}, 50 Hz
- Connection in separate terminal box
- Max. connection cross section 3 x 1.5 mm^2
- Cable screw fitting M16x1.5

Refer to the VS wiring diagram for information about connecting the VS forced cooling fan (order number: 0975 8385).

VR system

- 24 V_{DC} ± 20 %
- Plug connector
- Max. connection cross section 3x1 mm^2
- Pg7 cable gland with 7 mm inside diamater

The **VR forced cooling fan** is available for 24 V DC voltage and for 100 ... 240 V AC voltage.



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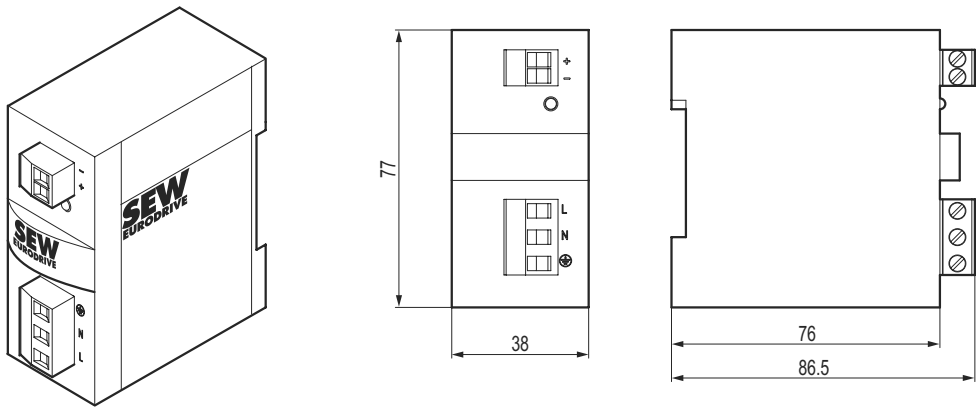
The AC voltage type includes a VR forced cooling fan and the UWU51A switch-mode power supply (→ following figure).

- Input: 90 ... 265 V_{AC} – 6 % / + 10 %, 50/60 Hz
- Output: 24 V_{DC} – 1 % / + 2 %, 1.3 A
- Connection: Terminal screws 0.2 ... 2.5 mm^2, separable
- Enclosure: IP20; mounted on mounting rail EN 60715TH35 in the switch cabinet



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Refer to the VR wiring diagram for information about connecting the VR forced cooling fan (order number: 0880 3198)

Motor size 132M - 280

V system

- 3 x 400 V_{AC}, 50 Hz
- Connection in separate terminal box
- Max. connection cross section 4 x 1.5 mm^2
- Cable gland M16x1.5

Refer to the V wiring diagram for information about connecting the V system (order number: 0975 8385).

A transformer may be present in the VS system to adapt to a voltage other than the standard. The VS and V systems are also available for 60 Hz.

Overview of encoders

Encoder	For SEW motor	Encoder type	Shaft	Specification	Supply	Signal
EH1T[1]	DR63...	Encoder	Hollow shaft	-	5 V_{DC} regulated	5 V_{DC} TTL/RS-422
EH1S[2]					24 V_{DC}	1 V_{ss} sin/cos
EH1R						5 V_{DC} TTL/RS-422
EH1C						24 V_{DC} HTL
ES1T[1]	CT/DT/CV/DV71...100 DTE/DVE90...100	Encoder	Spreadshaft	-	5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES1S[2]					24 V_{DC}	1 V_{ss} sin/cos
ES1R						5 V_{DC} TTL/RS-422
ES1C						24 V_{DC} HTL
ES2T[1]	CV/DV(E)112...132S				5 V_{DC} regulated	5 V_{DC} TTL/RS-422
ES2S[2]					24 V_{DC}	1 V_{ss} sin/cos
ES2R						5 V_{DC} TTL/RS-422
ES2C						24 V_{DC} HTL
EV1T[1]	CT/CV71...200 DT/DV71...280 DTE/DVE90...225		Solid shaft		5 V_{DC} regulated	5 V_{DC} TTL/RS-422
EV1S[2]					24 V_{DC}	1 V_{ss} sin/cos
EV1R						5 V_{DC} TTL/RS-422
EV1C						24 V_{DC} HTL
NV11	DT/DV71...132 DTE/DVE90...132S	Proximity sensor	Solid shaft	A track	24 V_{DC}	1 pulse/revolution, normally open contact
NV21				A+B tracks		
NV12				A track		2 pulses/revolution, normally open contact
NV22				A+B tracks		
NV16				A track		6 pulses/revolution, normally open contact
NV26				A+B tracks		
AV1Y	CT/CV71...200 DT/DV71...280 DTE/DVE90...225	absolute encoder	Solid shaft	-	15/24 V_{DC}	MSSI interface and 1 V_{ss} sin/cos
AV1H[3]		HIPERFACE® encoder			12 V_{DC}	RS485 interface and 1 V_{ss} sin/cos

1) Recommended encoder for operation with MOVITRAC® 31C

2) Recommended encoder for operation with MOVIDRIVE®

3) recommended encoder for operation with MOVIDRIVE® compact

- Refer to the following wiring diagrams for information about connecting ES1./ES2./EV1./EH1. encoders and AV1Y and AV1H absolute encoders:
  - Wiring diagrams for ES1./ES2./EV1./EH1. encoders: Order number 0918 6832
  - Wiring diagram AV1Y absolute encoder: Order number 0918 6808
  - Wiring diagram AV1H absolute encoder: Order number 1052 9705

- Maximum oscillation load for encoder ≤ 10 g ≈ 100 m/s^2 (10 Hz ... 2 kHz)
- Shock resistance ≤ 100 g ≈ 1000 m/s^2

Encoder connection

When connecting the encoders to the inverters, always follow the operating instructions for the relevant inverter!

- Maximum line length (inverter - encoder):
  - 100 m with a capacitance per unit length ≤ 120 nF/km
- Core cross section: 0,20 ... 0.5 mm^2
- Use a shielded cable with twisted pairs of insulated conductors (exception: cable for HTL sensor) and connect the shield over a large surface area at both ends:
  - to the encoder in the cable gland or in the encoder plug
  - to the inverter on the electronics shield clamp or to the housing of the sub D plug
- Install the encoder cables separately from the power cables, maintaining a distance of at least 200 mm.

6 Startup

6.1 Prerequisites for startup

It is essential to comply with the safety notes in Sec. 2 during startup!

Before startup, make sure that

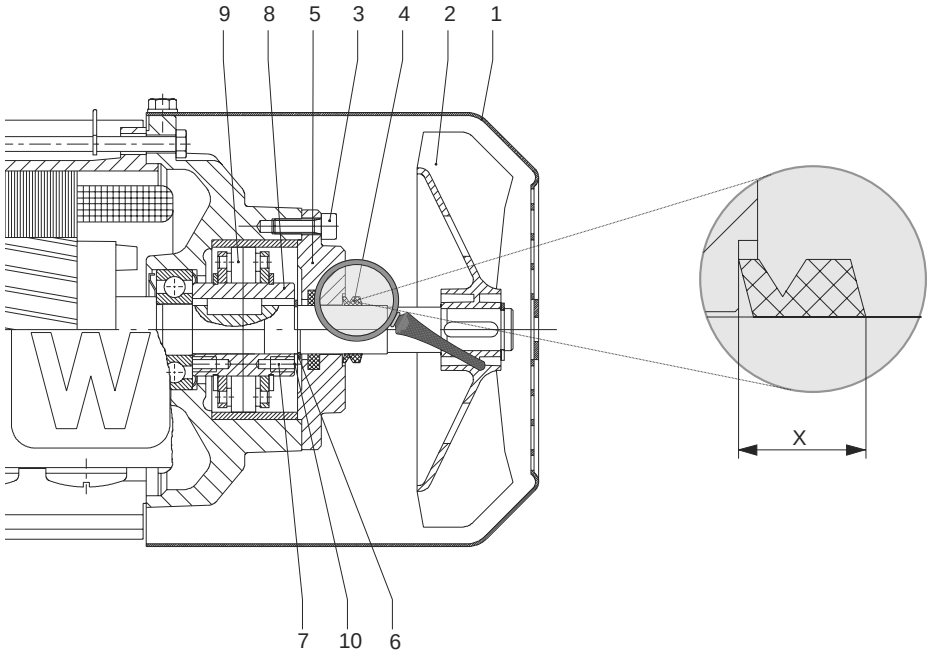
- The drive is undamaged and not blocked
- The measures stipulated in the "Preliminary work" section are performed after extended storage
- All connections have been made properly
- The direction of rotation of the motor/gearmotor is correct
  - (motor rotating clockwise: U, V, W to L1, L2, L3)
- All protective covers have been fitted correctly
- All motor protection equipment is active and set for the rated motor current
- The self-reengaging manual brake release is used in case of hoist drives
- There are no other sources of danger present

During startup, make sure that

- The motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.)
- The correct braking torque is set according to the specific application (→ Sec. "Technical Data")
- In case of problems (→ Sec. "Malfunctions")

In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup. A bracket is provided for storing the lever on the outside of the motor.

6.2 Altering the blocking direction on motors with a backstop



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[1] Fan guard
[2] Fan
[3] Hexagon socket head cap screw
[4] V-ring
[5] Felt ring
[6] Circlip
[7] Threaded hole
[8] Carrier
[9] Wedge element train
[10] Equalizing ring

Dimension "x" after installation

Motor	Dimension "x" after installation
DT71/80	6.7 mm
DT90/DV100	9.0 mm
DV112/132S	9.0 mm
DV132M-160M	11.0 mm
DV160L - 225	11.0 mm
DV250-280	13.5 mm

Do not start up the motor in the blocking direction (note the phase angle when connecting). Note the direction of rotation of the output shaft and the number of stages when mounting the motor on a gear unit. The backstop can be operated once in the blocking direction at half the motor voltage for checking purposes.

1. **Isolate the motor from the supply, safeguarding it against unintentional power-up.**
2. Remove fan guard [1] and fan [2], unscrew hexagon socket head cap screws [3]
3. Remove the V-ring [4] and sealing flange with felt ring [5]. (Collect the grease for subsequent use.)
4. Remove the circlip [6] (not for DT71/80); for DV132M-160M, also remove the equalizing rings [10].
5. Pull the carrier [8] and wedge element train [9] completely off the threaded holes [7], turn them by 180° and press them back on.

6. Refill the grease.
7. **Important: Do not exert pressure on or hit the wedge element train – danger of damaging the material!**
8. During the press-in operation – shortly before the wedge element penetrates the locking collar – slowly turn the rotor shaft by hand in the direction of rotation. This allows the wedge element to slide into the locking collar more easily.
9. Install the remaining parts of the backstop by following steps 4. to 2. in reverse order. Note the installation dimension "x" for the V-ring [4].

7 Malfunctions

7.1 Motor Malfunctions

Problem	Possible cause	Remedy
Motor does not start up	Interruption in connecting harness	Check connections, correct if necessary
	Brake does not release	→ Sec. "Brake Problems"
	Fuse blown	Replace fuse
	Motor protection has tripped	Check motor protection for correct setting, correct error if necessary.
	Motor protection does not switch, error in control	Check motor protection control, correct error if necessary.
Motor does not start or only with difficulty	Motor designed for delta connection but used in star connection	Correct circuit
	Voltage and frequency deviate markedly from setpoint, at least during switch-on	Provide better power supply system; check cross section of connecting harness
Motor does not start in star connection, only in delta connection	Torque not sufficient in star connection	Switch on directly if delta inrush current is not too great; otherwise use a larger motor or a special version (contact SEW)
	Contact fault on star delta switch	Rectify fault
Incorrect direction of rotation	Motor connected incorrectly	Swap over two phases
Motor hums and has high current consumption	Brake does not release	→ Sec. "Brake Problems"
	Winding defective	Send motor to specialist workshop for repair
	Rotor rubbing	
Fuses blow or motor protection trips immediately	Short circuit in line	Rectify short circuit
	Short circuit in motor	Send motor to specialist workshop for repair
	Lines connected incorrectly	Correct circuit
	Ground fault on motor	Send motor to specialist workshop for repair
Severe speed loss under load	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Voltage drops	Increase cross section of connecting harness
Motor heats up excessively (measure temperature)	Overload	Perform power measurement, use larger motor or reduce load if necessary
	Inadequate cooling	Correct cooling air supply or clear cooling air passages, retrofit forced cooling fan if necessary
	Ambient temperature is too high	Adhere to permitted temperature range
	Use delta connection for motor rather than star connection as provided for	Correct circuit
	Loose contact in connecting harness (one phase missing)	Rectify loose contact
	Fuse blown	Look for and rectify cause (see above); replace fuse
	Supply voltage deviates from rated motor voltage by more than 5 %. A higher voltage has a particularly unfavorable effect in motors with a low-speed winding since in these, the no-load current is already close to the rated current even when the voltage is normal.	Adapt motor to supply voltage
	Rated operation type (S1 to S10, DIN 57530) exceeded, e.g. through excessive starting frequency	Adjust rated operation type of motor to required operating conditions; if necessary call in a specialist to determine correct drive
Excessively loud	Ball bearing compressed, contaminated or damaged	Re-align motor, inspect ball bearing (→ Sect. "Permitted ball bearing types"), grease if necessary (→ Sect. "Lubricant Table for Anti-Friction Bearings of SEW Motors"), replace
	Vibration of rotating parts	Rectify cause, possibly imbalance
	Foreign bodies in cooling air passages	Clean the cooling air passages

7.2 Brake problems

Problem	Possible cause	Remedy
Brake does not release	Incorrect voltage on brake control unit	Apply correct voltage
	Brake control unit failed	Install a new brake control system, check internal resistance and insulation of brake coil, check switchgear
	Max. permitted working air gap exceeded because brake lining worn down	Measure and set working air gap
	Voltage drop along connecting harness > 10 %	Provide for correct connection voltage; check cable cross section
	Inadequate cooling, brake overheats	Replace type BG brake rectifier with type BGE
	Brake coil has interturn fault or short circuit to exposed conductive part	Replace complete brake and brake control system (specialist workshop), check switchgear
	Rectifier defective	Replace the rectifier and brake coil
Motor does not brake	Working air gap not correct	Measure and set working air gap
	Brake lining worn down	Replace entire brake disk
	Incorrect braking torque	Change the braking torque (→ Sect. "Technical Data") • By the type and number of brake springs • BrakeBMG 05: By installing the same brake coil body design as in brakeBMG 1 • BrakeBMG 2: By installing the same brake coil body design as in brakeBMG 4
	BM(G) only: Working air gap so large that setting nuts come into contact	Set the working air gap
	Only BR03, BM(G): Manual brake release device not set correctly	Set the setting nuts correctly
Brake is applied with time lag	Brake is switched on AC voltage side	Switch on DC and AC voltage sides (e.g. BSR); please refer to wiring diagram
Noise in the brake area	Gearing wear caused by jolting startup	Check project planning
	Pulsating torques due to incorrectly set frequency inverter	Check/correct setting of frequency inverter according to operating instructions

7.3 Malfunctions during operation with a frequency inverter

The symptoms described in the "Motor Malfunctions" section may also occur when the motor is operated with a frequency inverter. Please refer to the frequency inverter operating instructions for the significance of the problems which occur and to find information about rectifying the problems.

Customer service

Please have the following information to hand if you require the assistance of our customer service:
- Data from the nameplate (complete)
- Nature and extent of the fault
- Time and peripheral circumstances of the fault
- Presumed cause

8 Inspection / Maintenance

- Use only genuine spare parts in accordance with the valid parts list!
- Always install a new brake control system at the same time as replacing the brake coil!
- Motors can become very hot during operation danger of burns!
- Secure hoist drives or lower them (danger of falling).
- Isolate the motor and brake from the supply before starting work, safeguarding them against unintentional power-up!

8.1 Inspection and maintenance intervals

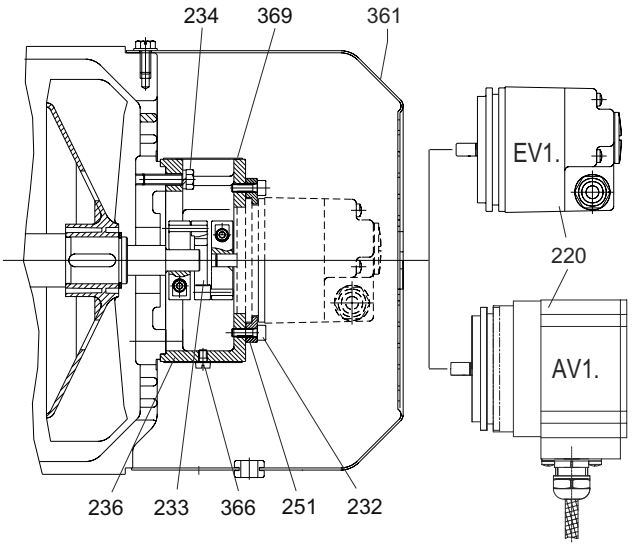
Unit / unit part	Frequency	What to do?
Brake BMG02, BR03, BMG05-8, BM15-62	• **If used as a working brake:** At least every 3000 hours of operation[1)]	Inspect the brake • Measure the brake disk thickness • Brake disk, lining • Measure and set working air gap • Pressure plate • Carrier / gearing • Pressure rings
	• **If used as a holding brake:** Every 2 to 4 years, depending on operating conditions [1)]	• Extract the abraded matter. • Inspect the switch elements and change if necessary (e.g. in case of burn-out)
Motor	• **Every 10,000 hours of operation**	Inspect the motor: • Check ball bearings and change if necessary • Change the oil seal • Clean the cooling air passages
Motor with backstop		• Change the low-viscosity grease in the backstop
Tacho-generator		• Inspection / maintenance as described in the enclosed operating instructions
Drive	• Varies (depending on external factors)	• Touch up or renew the surface/anticorrosion coating.

1) The periods of wear are affected by many factors and may be short. The machine designer must calculate the required inspection/maintenance intervals individually in accordance with the project planning documents (e.g. "Drive Planning").

8.2 Preliminary work for motor and brake maintenance

Isolate the motor and brake from the power supply before starting work, safeguarding them against unintentional power-up!

Removing the EV1. incremental encoder / AV1H absolute encoder



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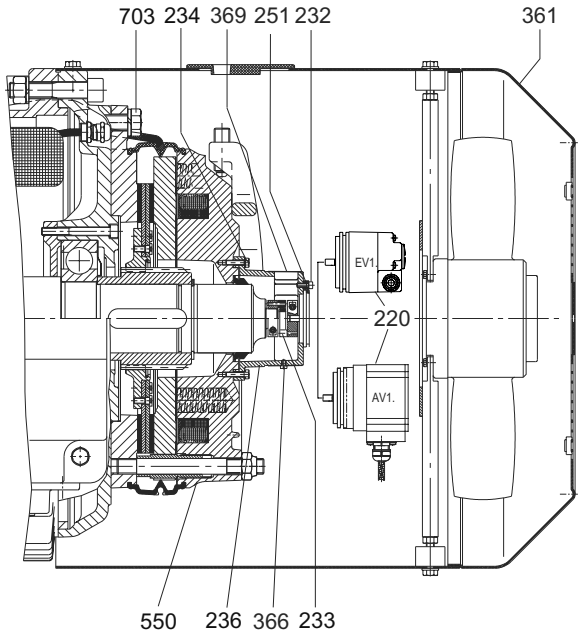
Removing EV1. / AV1 encoders from motors up to size 225



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Removing EV1. / AV1 encoders from motors from size 250 upwards

[220] Encoder
[232] Hexagon socket head cap screw
[233] Coupling
[234] Hex head screw
[236] Adapter flange
[251] Conical spring washer
[361] Protective canopy / fan guard
[366] Hexagon socket head cap screw
[369] Cover plate
[550] Brake
[703] Hex head screw

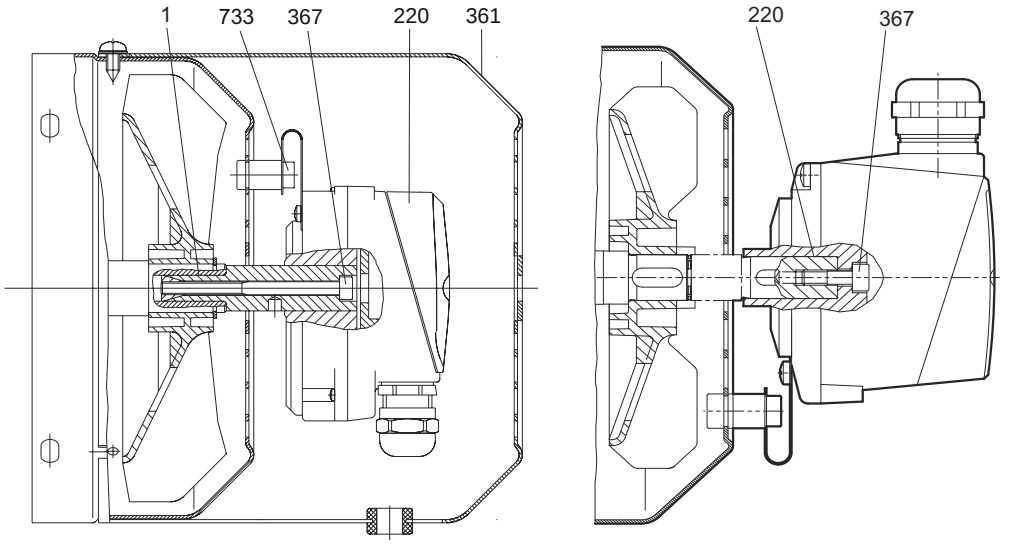
- Remove the protective canopy [361]. If a forced cooling fan is fitted, remove it first.
- Unscrew the screw [366] from the adapter flange and remove the cover plate [369].
- Unscrew the clamping hub connection of the coupling.
- Loosen the retaining screws [232] and turn the conical spring washers [251] outwards.
- Remove the encoder [220] together with the coupling [233].
- Lever off the intermediate flange [236] after removing the screws [234].

Note:

During re-assembly, make sure the runout of the shaft end is ≤ 0.05 mm.

Brakes for the encoder mounting must be completely replaced.

Incremental encoder ES1. Removing / ES2. / EH1.



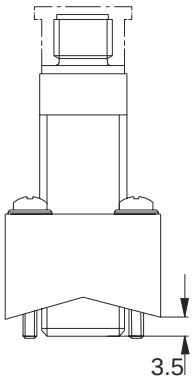
[220] Encoder
[367] Retaining screw
[361] Protective canopy
[733] Retaining screw for torque arm

- Remove the protective canopy [361].
- Unscrew the retaining screws [733] for the torque arm.
- Open the screw cover at the rear of the encoder [220].
- Unscrew the central retaining screw [367] by about 2-3 turns and loosen the cone by tapping lightly on the head of the screw. Then unscrew the retaining screw and pull off the encoder.

During re-assembly:

– Apply Noco® fluid to the encoder spigot
– Tighten the central retaining screw [367] to 2.9 Nm.

Removing the proximity sensor NV1. / NV2.



01114CXX

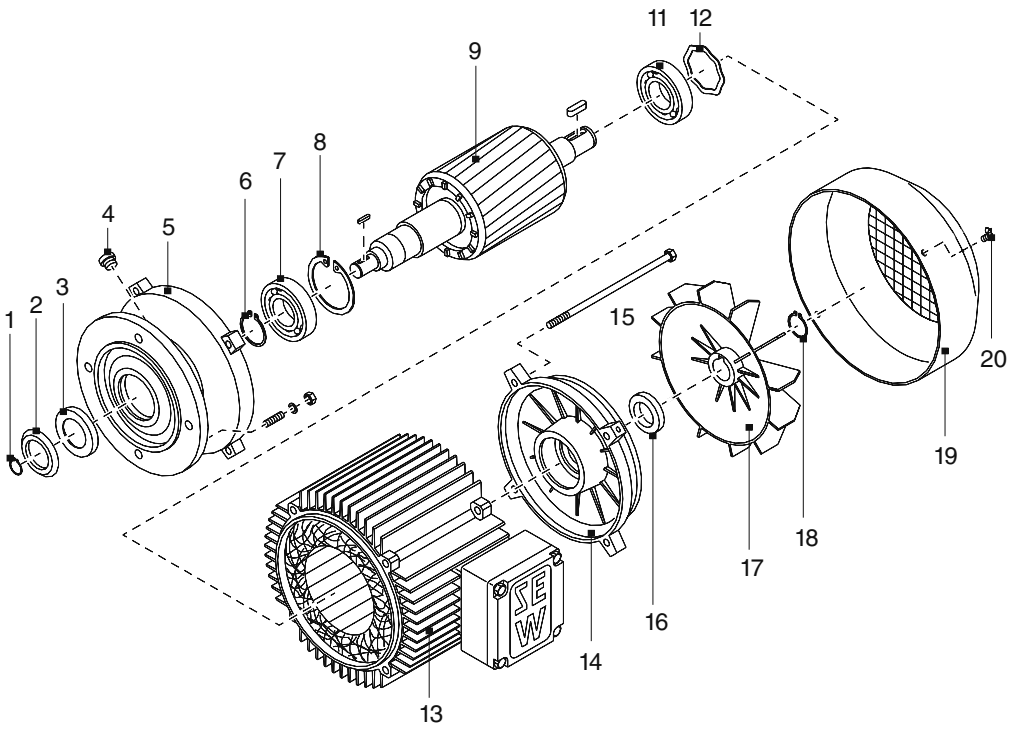
Caution! It is essential for the fan wheel to be stationary!

- Disconnect plug
- Pull off the fan guard including NV1. / NV2. Do not tilt it, in order to avoid damaging the proximity switch.
- If the mounting block has been removed from the fan guard or has come loose, it is essential to ensure the following during re-assembly:

  The switching surface of the proximity switch must be calibrated to a distance of 3.5 mm from the edge of the prismatic block (→ figure above).

8.3 Inspection / maintenance on the motor

Example: Motor DFT90



54008AXX

Key

1	Circlip	8	Circlip	16	V-ring
2	Oil-flinger ring	9	Rotor	17	Fan
3	Oil seal	11	Ball bearing	18	Circlip
4	Screw plug	12	Equalizing ring	19	Fan guard
5	Drive end bearing end shield	13	Stator	20	Housing screw
6	Circlip	14	Non drive-end bearing shield		
7	Ball bearing	15	Hex head bolt		

Sequence

Isolate the motor and brake from the supply, safeguarding them against unintentional power-up!

1. Remove the forced cooling fan and encoder, if installed (→ Sec. "Preliminary work for motor and brake maintenance")
2. Remove flange or fan guard [19], fan [17].
3. Remove the hex head bolt [15] from the drive end bearing end shield [5] and the non-drive end bearing end shield [14], release the stator [13] from the drive end bearing end shield.
4. **Motors with BM/BMG brake:**
   - Open the terminal box cover, unfasten the brake cable from the rectifier
   - Push the non-drive end bearing end shield and the brake off the stator and carefully lift them off (if necessary, run the brake cable along with trailing wire)
   - Pull the stator back by approx. 3 to 4 cm
5. **Motors with BMG02, BR03 brake:**
   - Remove the complete brake with the releasing lever (on version with manual brake release)
6. Visual inspection: Are there traces of gear oil or condensation inside the stator?
   - If not, continue with 9
   - If there is condensation, continue with 7
   - If there is gear oil, have the motor repaired by a specialist workshop
7. If there is moisture inside the stator:
   - With gearmotors: Remove the motor from the gear unit
   - With motors without a gear unit: Remove the drive end flange
   - Remove the rotor [9]
8. Clean the winding, dry it and check it electrically (→ Sec. "Preliminary work")
9. Replace the ball bearings [7], [11] (only use authorized ball bearings → Sec. "Permitted ball bearing types")
10. Reseal the stator seat ("Hylomar L Spezial") and grease the V-ring or labyrinth seal (DR63)
11. Install the motor, brake and accessories
12. Check the gear unit (→ gear unit operating instructions)

Lubrication of the backstop

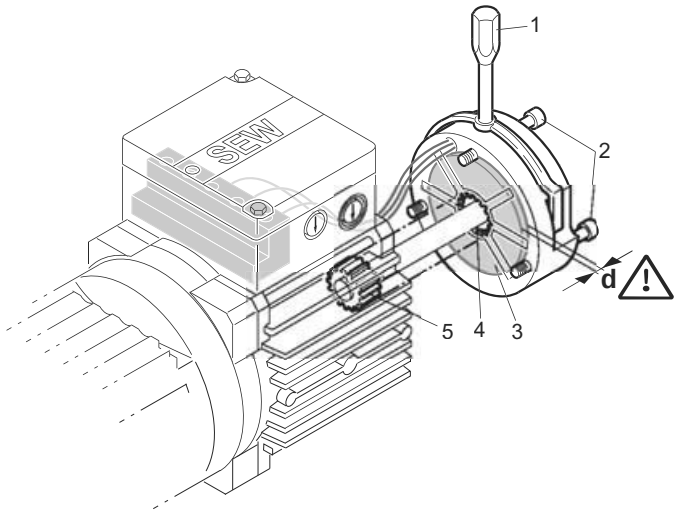
The backstop is supplied with Mobil LBZ low-viscosity grease as a lubricant and anticorrosion protection. If you want to use a different grease, make sure it complies with NLGI class 00/000, with a base oil viscosity of 42 mm^2/s at 40 °C on a lithium saponified and mineral oil base. The temperature range extends from –50 °C to +90 °C. See the following table for the amount of grease required.

Motor type	71/80	90/100	112/132	132M/160M	160L/225	250/280
Grease [g]	9	15	15	20	45	80

8.4 Inspection / maintenance of the BMG02 brake

Measure the brake disk thickness, install a new brake BMG02

The status of the brake disk is ascertained by measuring the brake disk thickness. Install a new BMG02 brake once the brake disk thickness reaches the minimum value (→ figure below). It is not possible to adjust the working air gap.



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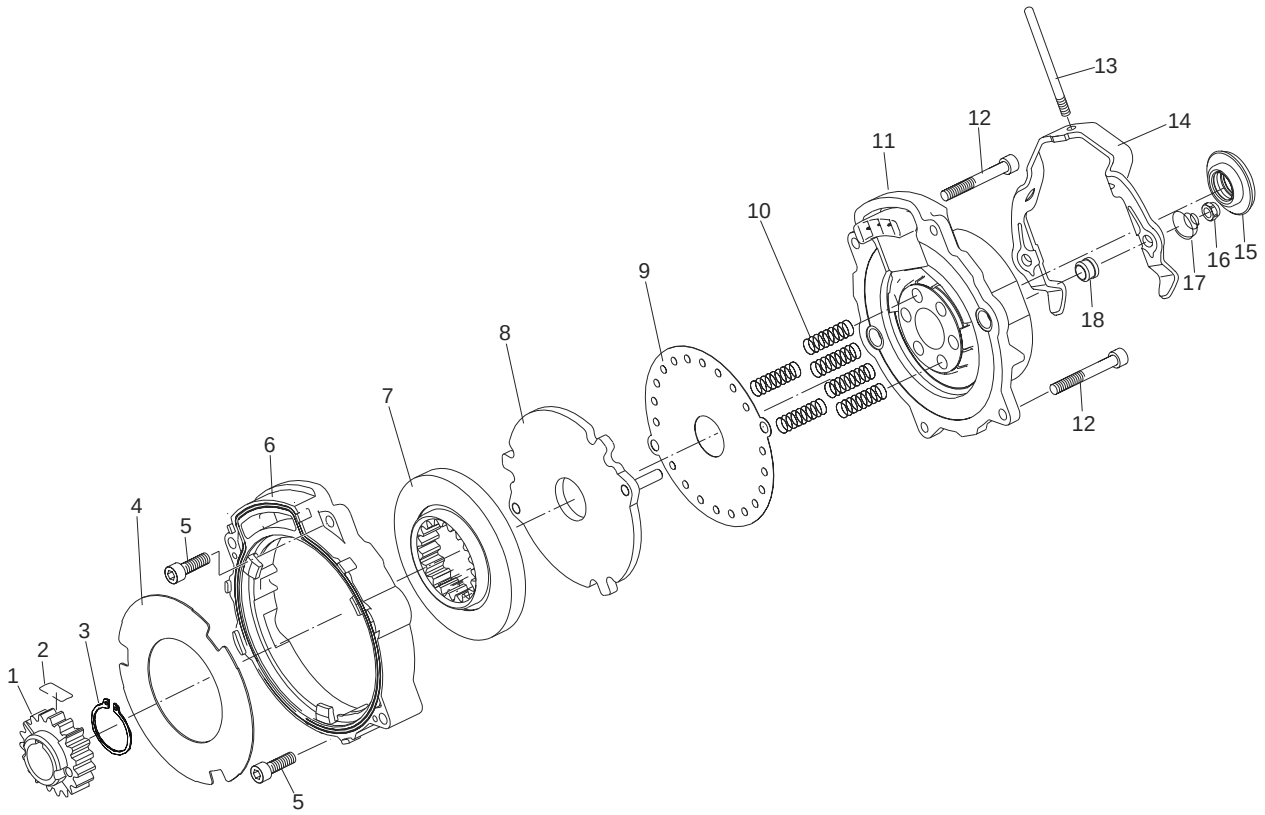
1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Unscrew the hand lever [1] (on version with manual brake release), remove the fan guard and the fan.
3. Loosen the screws [2] and remove the complete brake with the releasing lever (on version with manual brake release).
4. Measure the thickness "d" of the brake disk [3]:

Brake	Thickness "d" of the brake disk [mm]		Max. braking torque
Type	Maximum	Minimum	[Nm]
BMG02	6	5.4 5.6	0.8 1.2

5. **Replace the complete brake if the brake disk thickness has reached the minimum value.**
6. Install the complete brake in the motor:
   - Make sure that the gearing of the brake disk [4] engages in the gearing of the carrier [5]
   - Route the electric connection leads through the non drive-end bearing shield and the inside of the motor into the terminal box
7. Use screws [2] to install the brake back onto the non drive-end bearing shield
8. Refit the fan and fan guard, screw the hand lever [1] (on version with manual brake release)

8.5 Inspection / maintenance of the brake BR03



50067AXX

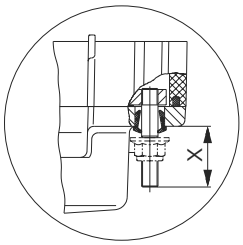
Key

1	Carrier	7	Brake disk	13	Hand lever
2	Clip	8	Pressure plate with stud	14	Releasing lever
3	Circlip	9	Damping plate	15	Sealing washer
4	Friction plate	10	Brake springs	16	Self locking counter nut
5	Screw	11	Brake coil body	17	Conical coil spring
6	Guide ring	12	Screw	18	Sealing element

Inspect brake BR03, measure the working air gap

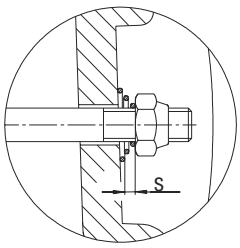
The working air gap cannot be adjusted and can only be measured by means of the stroke of the pressure plate when the brake is released.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Unscrew the hand lever [13] (on version with manual brake release), remove the fan guard and the fan.
3. Remove the self locking counter nuts [16] and, if manual brake release is fitted, remove the conical coil springs [17] and the releasing lever [14]
4. Measure clearance x (→ following figure) with the brake at rest:



50066AXX

   – From the end of the stud on the pressure plate [8] to the brake coil body [11]
5. Release the brake electrically
6. Measure clearance x with the brake released:
   – From the end of the stud on the pressure plate [8] to the brake coil body [11]
7. The differential corresponds to the working air gap, i.e. the stroke of the pressure plate [18]:
   – If the working air gap ≤ 0.8 mm, reinstall the conical coil springs [17], releasing lever [14] and self locking counter nuts [16]
   – If the working air gap ≥ 0.8 mm, install a complete new brake
   – Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ following figure)



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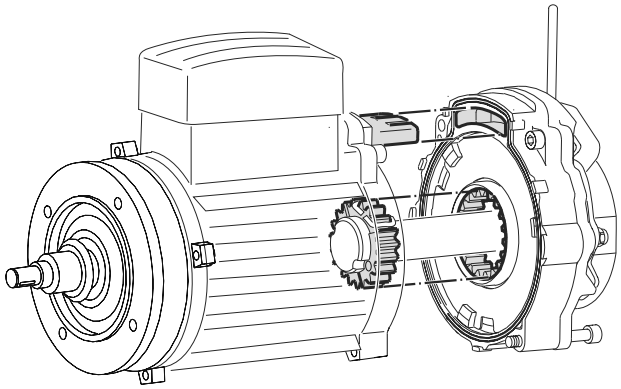
Brake	Floating clearance s [mm]
BR03	2

Important: The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

8. Reassemble the removed parts. Connect the complete new brake (replaced if the working air gap ≥ 0.8 mm) to the motor (→ following figure)
   – Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end.



50175AXX

Changing the BR03 braking torque

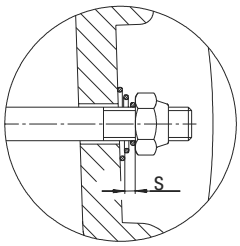
The braking torque can be changed in steps (→ Sec. "Work done, working air gap, braking torques of brake BR03, BMG05-8")

- by installing different brake springs
- by changing the number of brake springs

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up!**
2. Unscrew the hand lever [13] (on version with manual brake release), remove the fan guard and the fan.
3. Loosen the screws [12] and remove the complete brake with the releasing lever (on version with manual brake release).
4. Loosen the screws [5] and remove the guide ring [6] with friction plate [4], brake disc [7], pressure plate [8] and damping plate [9]
5. Remove the brake springs [10] from the brake coil body [11] and replace them with new ones.
6. Position the new brake springs symmetrically
7. Slide the damping plate [9] over the two studs attached to the pressure plate [8] so the embossing pattern is located with the projecting side facing the pressure plate.
8. Pressure plate [8]:
   – Place on the brake springs [10] together with the damping plate [9]
   – Guide the studs attached to the pressure plate [8] through the holes in the brake coil body [6] and make sure the pressure plate is in the correct position
9. Place the flat side of the brake disk [7] on the pressure plate [8].

   Note: Do not bring the disk into contact with grease or oil!
10. Place the guide ring [6] and friction disk [4] onto the brake disk [7], press down and install the screws [5].

11. **Design with manual brake release:**
    - Put on the conical coil springs [17] and releasing lever [14], install the self locking counter nuts [16]
    - With manual brake release: Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ following figure)

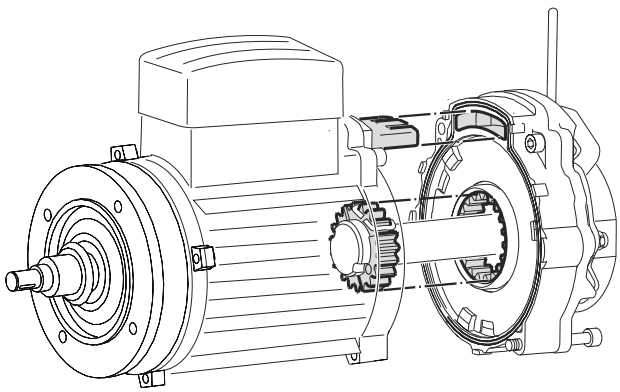


01111BXX

Brake	Floating clearance s [mm]
BR03	2

Important: The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

12. Connect the complete brake back onto the motor (→ following figure):
    - Make sure the gearing of the brake disk engages in the gearing of the carrier and that the plug on the motor end fits into the socket on the brake end



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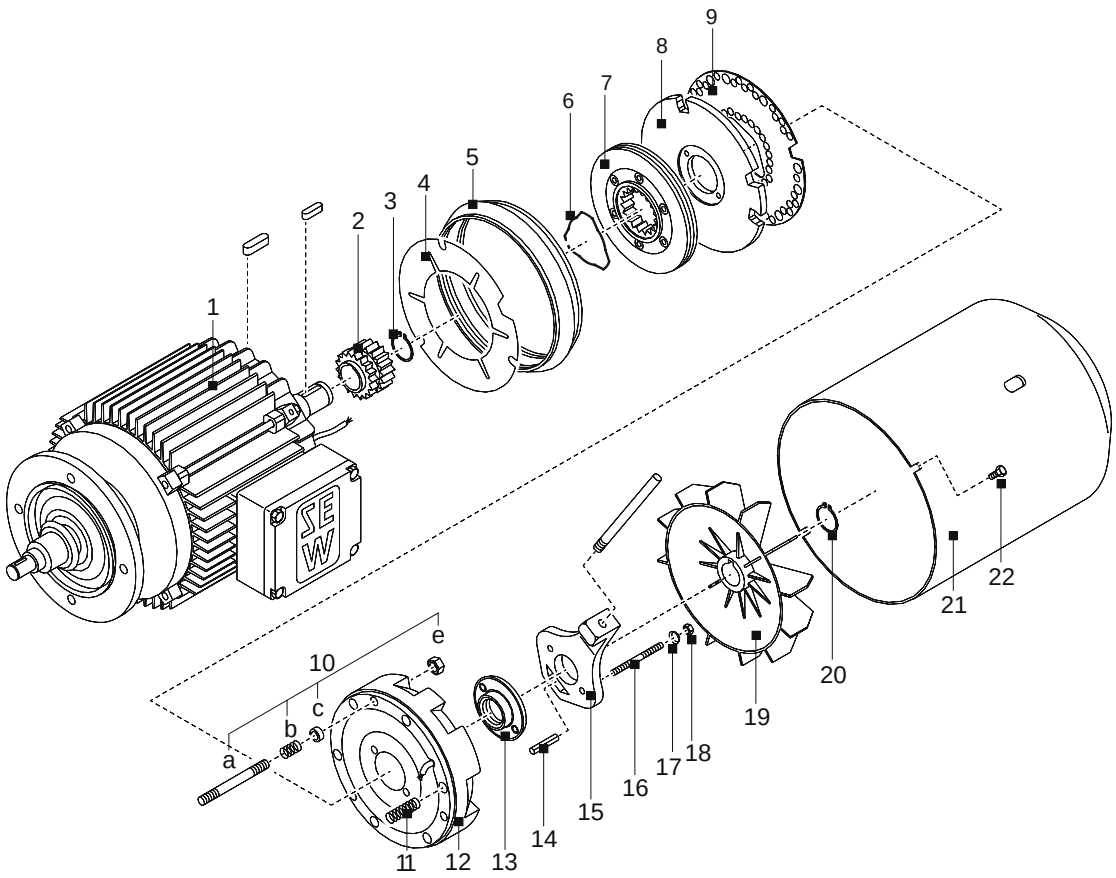
13. Refit the fan and fan guard, screw the hand lever [10] (on version with manual brake release)

8.6 Inspection / maintenance for BMG05-8, BM15-62 brakes

BM(G)05-08 brakes

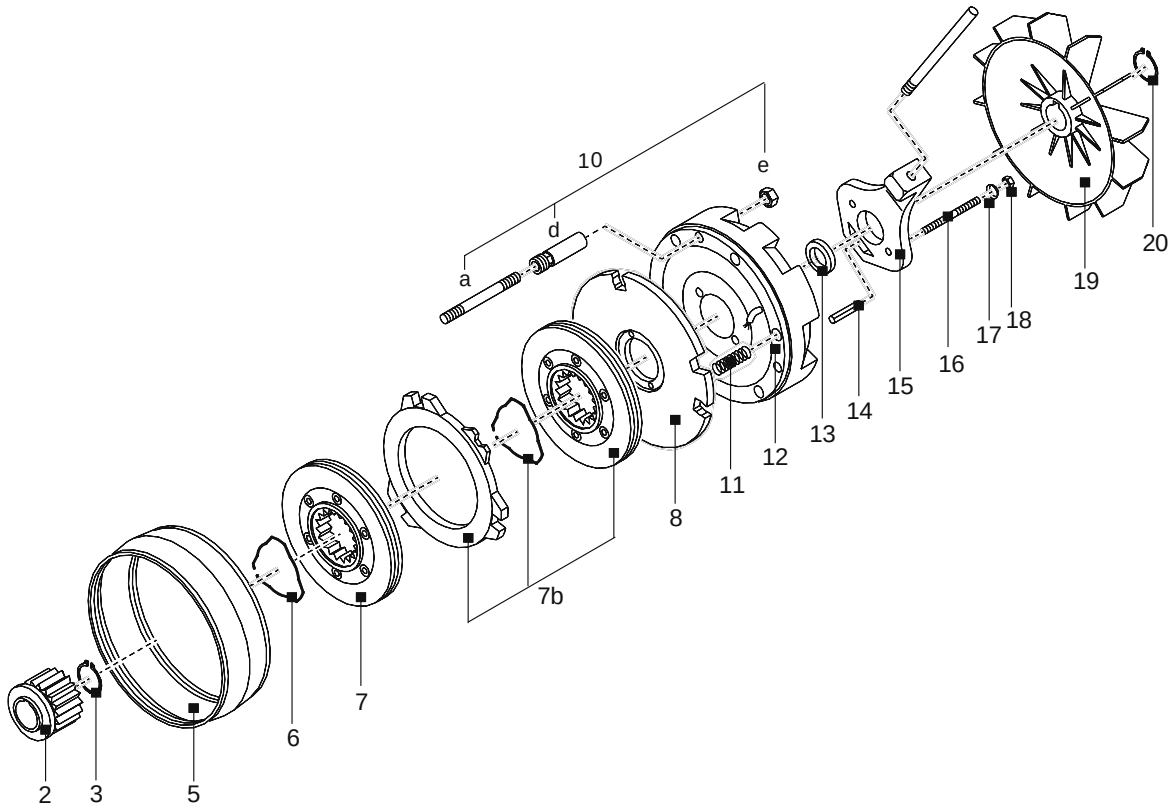


01955AXX

Key

1	Motor with brake bearing end shield	10a	Stud (3 pcs.)	15	Release lever with hand lever
2	Carrier	10b	Counter spring	16	Stud (2 pcs.)
3	Circlip	10c	Pressure ring	17	Conical coil spring
4	Niro disk (BMG only)	10e	Hex nut	18	Setting nut
5	Rubber sealing collar	11	Brake spring	19	Fan
6	Annular spring	12	Brake coil body	20	Circlip
7	Brake disk	13	In BMG: Gasket	21	Fan guard
8	Pressure plate		In BM: V-ring	22	Housing screw
9	Damping plate (BMG only)	14	Dowel pin		

BM15-62 brake



01956AXX

Key

1	Motor with brake bearing end shield	8	Pressure plate	14	Dowel pin
2	Carrier	9	Damping plate (BMG only)	15	Release lever with hand lever
3	Circlip	10a	Stud (3 pcs.)	16	Stud (2 pcs.)
4	Niro disk (BMG only)	10b	Counter spring	17	Conical coil spring
5	Rubber sealing collar	10c	Pressure ring	18	Setting nut
6	Annular spring	10e	Hex nut	19	Fan
7	Brake disk	11	Brake spring	20	Circlip
7b	Only BM 32, 62: Brake stationary disk, annular spring, Brake disk	12	Brake coil body	21	Fan guard
		13	In BMG: Gasket In BM: V-ring	22	Housing screw

BMG05-8, BM15-62 brakes, set the working air gap

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the following:
   - If installed, forced cooling fan, tacho/encoder (→ Sec. "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard [21]
3. Push the rubber sealing collar aside [5]
   - Release the clip to do this, if necessary
   - Extract the abraded matter.
4. Measure the brake disc [7], [7b]:

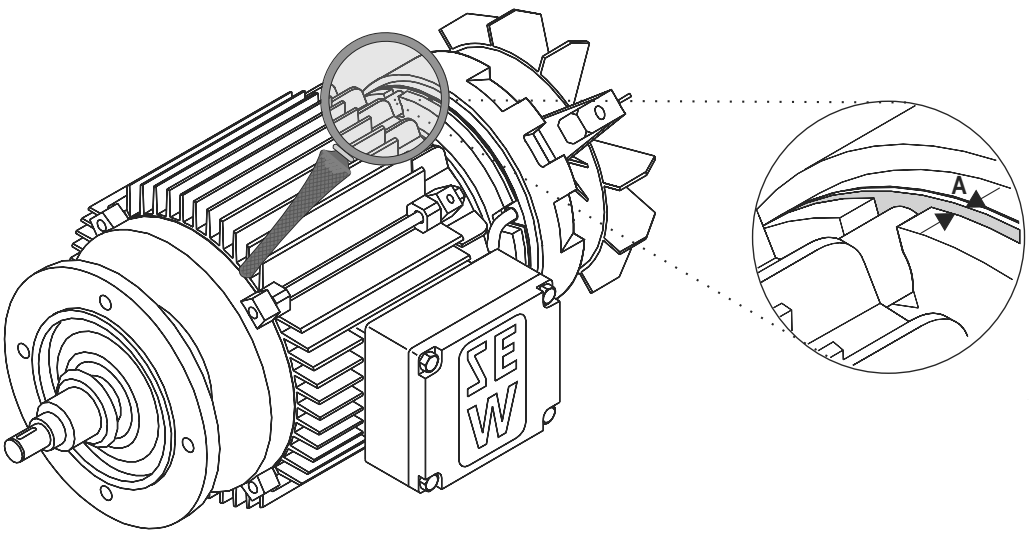
   If the brake disk is
   - ≤ 9 mm on brake motors up to size 100
   - ≤ 10 mm on brake motors up to size 112

   Install a new brake disk (→ Sec. "Changing the brake disk BMG 05-8, BM 15-62"), otherwise
5. **With BM30-62:**

   Loosen the setting sleeve [10d] by turning it towards the bearing end shield
6. Measure the working air gap A (→ following figure)

   (use a feeler gauge and measure at three points offset by 120°)
   - In BM, between the pressure plate [8] and the brake coil body [12]
   - In BMG, between the pressure plate [8] and the damping plate [9]
7. Tighten the hexagon nuts [10e]
   - Until the working air gap is set correctly (→ Sec. "Technical Data")
   - In BM 30-62, until the working air gap is initially 0.25 mm
8. **With BM30-62:**

   Tighten the setting sleeves
   - Against the brake coil body
   - Until the working air gap is set correctly (→ Sec. "Technical Data")
9. Install the rubber sealing collar back in place and re-install the dismantled parts



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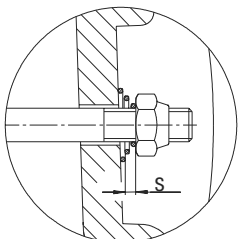
Changing the BMG05-8, BM15-62 brake discs

When fitting a new brake disk (in BMG05-4 ≤ 9 mm; in BMG62 ≤ 10 mm) inspect the other removed parts as well and install new ones if necessary.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up!**
2. Remove the following:
   – If installed, forced cooling fan, tacho/encoder (→ Sec. "Preliminary work for motor and brake maintenance")
   – Flange or fan guard [21], circlip [20] and fan [19].
3. Remove the rubber sealing collar [5] and the manual brake release:
   – Setting nuts [18], conical coil springs [17], studs [16], release lever [15], dowel pin [14]
4. Unscrew hexagon nuts [10e], carefully pull off the coil body [12] (brake cable!) and take out the brake springs [11].
5. Remove the damping cable [9], pressure plate [8] and brake disc [7], [7b], clean the brake components
6. Install a new brake disk
7. Re-install the brake components
   – Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ Sec. "Inspecting brake BMG 05-8, BM 30-62, setting the working air gap", points 5 to 8)
8. With manual brake release: Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ following figure)



01111BXX

Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

9. Install the rubber sealing collar back in place and re-install the dismantled parts.

Notes

- The lockable manual brake release (type HF) is already released if resistance is encountered when operating the grub screw.
- The self-reengaging manual brake release (type HR) can be operated with normal hand pressure.

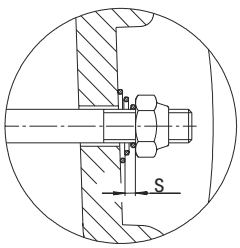
Important: In brake motors with self-reengaging manual brake release, the manual brake release lever must be removed after startup/maintenance! A bracket is provided for storing the lever on the outside of the motor.

Change braking torque of BMG05-8, BM15-62

The braking torque can be changed in steps (→ Sec. "Technical Data")

- by installing different brake springs
- by changing the number of brake springs
- by changing the brake coil body:
  - **BMG05:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body [12] of brake BMG1 of the same design to ensure safe braking
  - **BMG2:** if the maximum braking torque is not sufficient for the specific application, install the brake coil body [12] of brake BMG4 of the same design to ensure safe braking

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up**
2. Remove the following:
   - If installed, forced cooling fan, tacho/encoder (→ Sec. "Preliminary work for motor and brake maintenance")
   - Flange or fan guard [21], circlip [20] and fan [19].
3. Remove the rubber sealing collar [5] and the manual brake release:
   - Setting nuts [18], conical coil springs [17], studs [16], release lever [15], dowel pin [14]
4. Unscrew hex nuts [10e], pull off the coil body [12].
   - by approx. 50 mm (watch the brake cable!)
5. Change or add brake springs [11]
   - Position the brake springs symmetrically
6. Re-install the brake components
   - Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ Sec. "Inspecting brake BMG 05-8, BM 15-62", points 5 to 8)
7. With manual brake release: Use setting nuts to set the floating clearance "s" between the conical coil springs (pressed flat) and the setting nuts (→ following figure)



01111BXX

Brake	Floating clearance s [mm]
BMG05-1	1.5
BMG2-8	2
BM15-62	2

Important: The floating clearance "s" is necessary so that the pressure plate can move up as the brake lining wears. Otherwise, reliable braking is not guaranteed.

8. Install the rubber sealing collar back in place and re-install the dismantled parts.

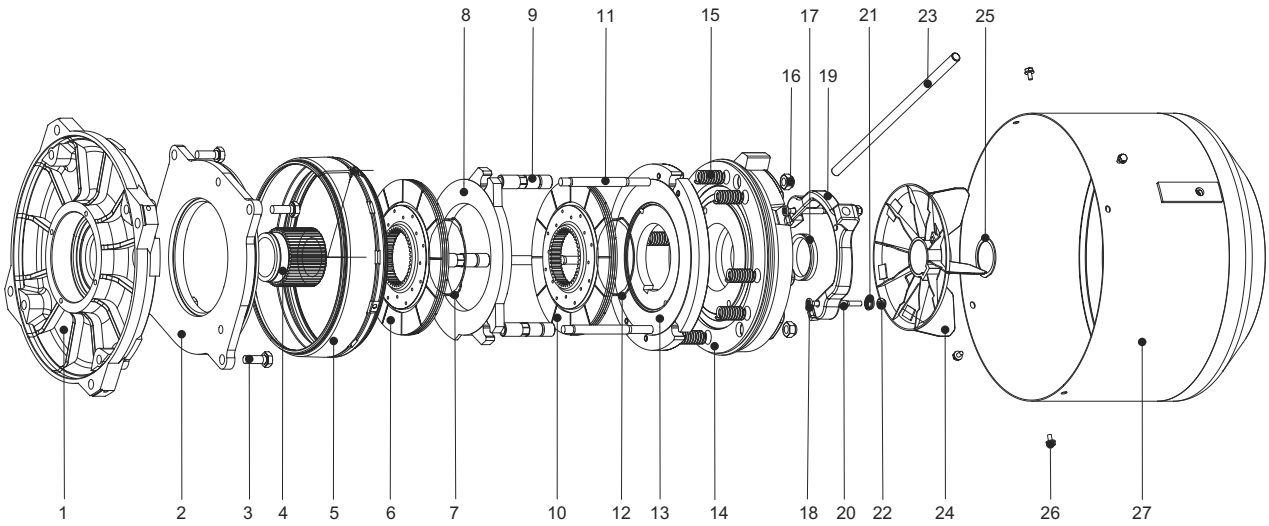
Note

Install new setting nuts [18] and hexagon nuts [10e] if the removal procedure is repeated!

8.7 Inspection / maintenance of the BMG61/122 brake

BMG61/122 brakes with encoder mounting are only used as a holding brake. Maintenance work is only allowed to be performed by SEW-EURODRIVE.

BMG61/122 brakes



54318AXX

Key

1	Brake end shield	10	Brake disc, complete 2	19	Release lever
2	Intermediate flange	11	Stud	20	Stud
3	Hex head bolt	12	Annular spring 2	21	Conical coil spring
4	Carrier	13	Brake stationary disc	22	Hex nut
5	Rubber sealing collar	14	Magnet, complete	23	Hand lever
6	Brake disc, complete 1	15	Brake spring	24	Fan
7	Annular spring 1	16	Hex head bolt	25	Circlip
8	Brake stationary disc	17	V-ring	26	Hex head bolt
9	Setting sleeve	18	O-ring	27	Fan guard

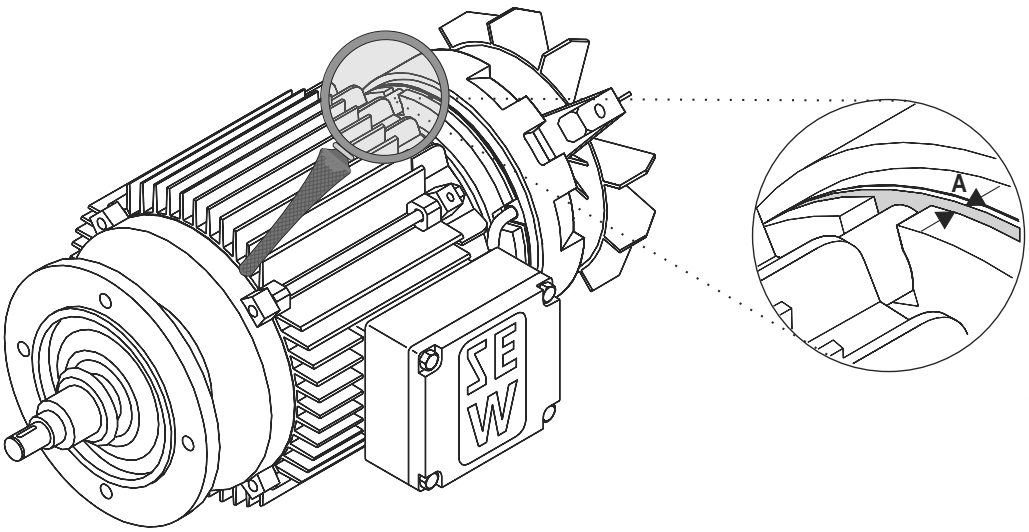
BMG61/122 brake without encoder mounting, set the working air gap

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up.**
2. Remove the following:
   - Remove the forced cooling fan, if installed (→ Sec. "Preliminary work for motor and brake maintenance")
   - Flange cover or fan guard [27]
3. Push the rubber sealing collar aside [5]
   - Release the clamping strap to do this, if necessary
   - Extract the abraded matter.
4. Measure the brake discs [6], [10]:

   If the brake disc ≤ 12 mm, change it (→ Sec. "Changing the BMG 61/122 brake disc), otherwise
5. Loosen the setting sleeve [9] by turning it towards the bearing end shield
6. Measure the working air gap A (→ following figure)

   (use a feeler gauge and meausure at three points offset by 120° between the pressure plate [13] and the magnet [14])

   –
7. Tighten the hexagon nuts [16]
   - Until the working air gap is initially 0.25 mm
8. Tighten the setting sleeves [9]
   - Against the magnet [14]
   - Until the working air gap is set correctly (→ Sec. "Technical Data")
9. Refit the rubber sealing collar [5] and re-install the dismantled parts



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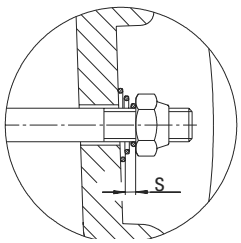
BMG 61/122 brake without encoder mounting, change the brake disc

When fitting a new brake disk (≤ 12 mm), inspect the other removed parts as well and install new ones if necessary.

1. **Isolate the motor and brake from the supply, safeguarding them against unintentional power-up!**
2. Remove the following:
   - Forced cooling fan, if installed (→ Sec. "Preliminary work for motor and brake maintenance")
   - Flange or fan guard [27], circlip [25] and fan [24].
3. Remove the rubber sealing collar [5] and the manual brake release:
   - Hex nuts [16], conical coil springs [21], studs [20], release level [17]
4. Loosen the hex nuts [16], remove the connection cable to the plug connector for the magnet [14], remove the magnet, and remove the brake springs [15].
5. Remove the complete pressure plate [8], the complete brake disc [10] as well as the brake stationary disk and complete brake disc [6] for BMG122, clean the brake components.
6. Install a new brake disk
7. Re-install the brake components
   - Except for the rubber sealing collar, fan and fan guard, set the working air gap (→ Sec. "Inspecting brake BMG 61/122, setting the working air gap", points 5 to 8)
8. With manual brake release: Use setting nuts [22] to set the floating clearance "s" between the conical coil springs [21] (pressed flat) and the setting nuts (→ following figure)



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s = 2 mm

9 Technical Data

9.1 Work done, braking torque BMG02

Brake Type	For motor size	Work done until maintenance	Thickness of brake disk [mm]		Braking torque
		[10^6 J]	max.	min	[Nm]
BMG02	DT56 ET56	30	6	5.6 5.4	1.2 0.8

9.2 Information for ordering a replacement BMG02

Brake Type	Voltage [V_{DC}]	Braking torque [Nm]	Brake part number
BMG02	24	0.8	0574 319 2
		1.2	0574 323 0
BMG02/HR	24	0.8	0574 327 3
		1.2	0574 331 1

Brake Type	Voltage [V_{AC}]	Braking torque [Nm]	Brake part number
BMG02	230	0.8	0574 320 6
		1.2	0574 324 9
	400	0.8	0574 321 4
		1.2	0574 325 7
	460/500	0.8	0574 322 2
		1.2	0574 326 5
BMG02/HR	230	0.8	0574 328 1
		1.2	0574 332 X
	400	0.8	0574 329 X
		1.2	0574 333 8
	460/500	0.8	0574 330 3
		1.2	0574 334 6

9.3 Work done, working air gap, braking torques of BMG05-8, BR03, BC, Bd

Brake type	For motor size	Work done until maintenance	Working air gap [mm]		Braking torque settings				
					Braking torque	Type and no. of brake springs		Order number of brake springs	
		[10^6 J]	min.[1]	max.	[Nm]	standard	red	standard	red
BR03	63	200	-	0.8	3.2 2.4 1.6 0.8	6 4 3 -	- 2 - 6	185 815 7	185 873 4
BMG05[2]	71 80	60	0.25	0.6	5.0 4.0 2.5 1.6 1.2	3 2 - - -	- 2 6 4 3	135,017 X	135 018 8
BMG1	80	60	0.25	0.6	10 7.5 6.0	6 4 3	- 2 3	135,017 X	135 018 8
BMG2[3]	90 100	130	0.25	0.6	20 16 10 6.6 5.0	3 2 - - -	- 2 6 4 3	135 150 8	135 151 6
BMG4	100	130	0.25	0.6	10 30 24	6 4 3	- 2 3	135 150 8	135 151 6
BMG8	112M 132S	300	0.3	0.9	75 55 45 37 30 19 12.6 9.5	6 4 3 3 2 - - -	- 2 3 - 2 6 4 3	184 845 3	135 570 8

1) Please note when checking the working air gap: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.1 mm after a test run.

2) BMG05: If the maximum braking torque (5 Nm) is not sufficient, it is possible to install the brake coil body of the BMG1 brake.

3) BMG2: If the maximum braking torque (20 Nm) is not sufficient, it is possible to install the brake coil body of the BMG4 brake.

9.4 Work done, working air gap, braking torques of BM15 - 62

Brake type	For motor size	Work done until maintenance [10^6 J]	Working air gap [mm]		Braking torque settings				
					Braking torque	Type and no. of springs		Order number of springs	
			min.[1]	max.	[Nm]	standard	red	standard	red
BM15	132M, ML 160M	1000	0.3	1.2	150 125 100 75 50 35 25	6 4 3 3 - - -	- 2 3 - 6 4 3	184 486 5	184 487 3
BM30	160L 180	1500			300 250 200 150 125 100 75 50	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4	187 455 1	187 457 8
BM31	200 225	1500							
BM32[2]	180	1500	0.4	1.2	300 250 200 150 100	4 2 - - -	- 4 8 6 4	187 455 1	187 457 8
BM62[2]	200 225	1500			600 500 400 300 250 200 150 100	8 6 4 4 2 - - -	- 2 4 - 4 8 6 4		
BMG61	250 280	2500	0.3	1.2	600 500 400 300 200	8 6 4 4 -	- 2 4 - 8	186 838 1	186,839 X
BMG122[2]			0.4		1200 1000 800 600 400	8 6 4 4 -	- 2 4 - 8		

1) Please note when checking the working air gap: Parallelism tolerances on the brake disk may give rise to deviations of ± 0.15 mm after a test run.

2) Double disc brake

9.5 Operating currents

The current values I_H (holding current) specified in the tables are r.m.s. values. Use only units to measure the r.m.s. values. The inrush current (acceleration current) I_B only flows for a short time (max. 120 ms) when the brake is released or during voltage dips below 70 % of rated voltage. There is no increased inrush current if the BG brake rectifier is used or if there is a direct DC voltage supply – both are only possible with brakes up to motor size BMG4.

BMG02, BR03 brake

	BMG02	BR03
Motor size	56	63
Max. braking torque [Nm]	1.2	3.2
Braking power [W]	25	25
Inrush current ratio I_B/I_H	-	4

Rated voltage V_N		BMG02		BR03	
V_{AC}	V_{DC}	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
	24	-	0.72	-	0.72
24 (23-26)	**10**	-	-	1.5	1.80
42 (40-45)	**18**	-	-	0.81	1.01
48 (46-50)	**20**	-	-	0.72	0.90
53 (51-56)	**22**	-	-	0.64	0.80
60 (57-63)	**24**	-	-	0.57	0.72
67 (64-70)	**27**	-	-	0.50	0.64
73 (71-78)	**30**	-	-	0.45	0.57
85 (79-87)	**36**	-	-	0.40	0.51
92 (88-98)	**40**	-	-	0.35	0.45
110 (99-110)	**44**	-	-	0.31	0.40
120 (111-123)	**48**	-	-	0.28	0.36
133 (124-138)	**54**	-	-	0.25	0.32
147 (139-154)	**60**	-	-	0.22	0.29
160 (155-173)	**68**	-	-	0.20	0.25
184 (174-193)	**75**	-	-	0.17	0.23
208 (194-217)	**85**	-	-	0.16	0.20
230 (218-243)	**96**	0.14	0.18	0.14	0.18
254 (244-273)	**110**	-	-	0.12	0.16
290 (274-306)	**125**	-	-	0.11	0.14
318 (307-343)	**140**	-	-	0.10	0.13
360 (344-379)	**150**	-	-	0.09	0.11
400 (380-431)	**170**	0.08	0.10	0.08	0.10
460 (432-500)	**190**	0.07	0.09	0.07	0.09

Key

- I_B Accelerator current – brief inrush current
- I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier
- I_G Direct current with direct DC voltage supply with rated voltage V_N
- V_N Rated voltage (rated voltage range)

BMG 05 - BMG 4 brake

	BMG05	BMG1	BMG2	BMG4
Motor size	71/80	80	90/100	100
Max. braking torque [Nm]	5	10	20	40
Braking power [W]	32	36	40	50
Inrush current ratio I_B/I_H	4	4	4	4

Rated voltage V_N		BMG05		BMG 1		BMG 2		BMG 4	
V_{AC}	V_{DC}	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]	I_H [A_{AC}]	I_G [A_{DC}]
	24		1.38		1.54		1.77		2.20
24 (23-25)	**10**	2.0	3.3	2.4	3.7	-	-	-	-
42 (40-46)	**18**	1.14	1.74	1.37	1.94	1.46	2.25	1.80	2.80
48 (47-52)	**20**	1.02	1.55	1.22	1.73	1.30	2.00	1.60	2.50
56 (53-58)	**24**	0.90	1.38	1.09	1.54	1.16	1.77	1.43	2.20
60 (59-66)	**27**	0.81	1.23	0.97	1.37	1.03	1.58	1.27	2.00
73 (67-73)	**30**	0.72	1.10	0.86	1.23	0.92	1.41	1.14	1.76
77 (74-82)	**33**	0.64	0.98	0.77	1.09	0.82	1.25	1.00	1.57
88 (83-92)	**36**	0.57	0.87	0.69	0.97	0.73	1.12	0.90	1.40
97 (93-104)	**40**	0.51	0.78	0.61	0.87	0.65	1.00	0.80	1.25
110 (105-116)	**48**	0.45	0.69	0.54	0.77	0.58	0.90	0.72	1.11
125 (117-131)	**52**	0.40	0.62	0.48	0.69	0.52	0.80	0.64	1.00
139 (132-147)	**60**	0.36	0.55	0.43	0.61	0.46	0.70	0.57	0.88
153 (148-164)	**66**	0.32	0.49	0.39	0.55	0.41	0.63	0.51	0.79
175 (165-185)	**72**	0.29	0.44	0.34	0.49	0.37	0.56	0.45	0.70
200 (186-207)	**80**	0.26	0.39	0.31	0.43	0.33	0.50	0.40	0.62
230 (208-233)	**96**	0.23	0.35	0.27	0.39	0.29	0.44	0.36	0.56
240 (234-261)	**110**	0.20	0.31	0.24	0.35	0.26	0.40	0.32	0.50
290 (262-293)	**117**	0.18	0.28	0.22	0.31	0.23	0.35	0.29	0.44
318 (294-329)	**125**	0.16	0.25	0.19	0.27	0.21	0.31	0.25	0.39
346 (330-369)	**147**	0.14	0.22	0.17	0.24	0.18	0.28	0.23	0.35
400 (370-414)	**167**	0.13	0.20	0.15	0.22	0.16	0.25	0.20	0.31
440 (415-464)	**185**	0.11	0.17	0.14	0.19	0.15	0.22	0.18	0.28
500 (465-522)	**208**	0.10	0.15	0.12	0.17	0.13	0.20	0.16	0.25

Key

I_B Accelerator current – brief inrush current

I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier

I_G Direct current with direct DC voltage supply

V_N Rated voltage (rated voltage range)

BMG 8 - BM 32/62 brake

	BMG8	BM 15	BM30/31; BM32/62
Motor size	112/ 132S	132M-160M	160L-225
Max. braking torque [Nm]	75	150	600
Braking power [W]	65	95	120
Inrush current ratio I_B/I_H	6.3	7.5	8.5

Rated voltage V_N		BMG8	BM 15	BM 30/31; BM 32/62
V_{AC}	V_{DC}	I_H [A_{AC}]	I_H [A_{AC}]	I_H [A_{AC}]
	24	2.77[1)]	4.15[1)]	4.00[1)]
42 (40-46)	**-**	2.31	3.35	-
48 (47-52)	**-**	2.10	2.95	-
56 (53-58)	**-**	1.84	2.65	-
60 (59-66)	**-**	1.64	2.35	-
73 (67-73)	**-**	1.46	2.10	-
77 (74-82)	**-**	1.30	1.87	-
88 (83-92)	**-**	1.16	1.67	-
97 (93-104)	**-**	1.04	1.49	-
110 (105-116)	**-**	0.93	1.32	1.78
125 (117-131)	**-**	0.82	1.18	1.60
139 (132-147)	**-**	0.73	1.05	1.43
153 (148-164)	**-**	0.66	0.94	1.27
175 (165-185)	**-**	0.59	0.84	1.13
200 (186-207)	**-**	0.52	0.74	1.00
230 (208-233)	**-**	0.46	0.66	0.90
240 (234-261)	**-**	0.41	0.59	0.80
290 (262-293)	**-**	0.36	0.53	0.71
318 (294-329)	**-**	0.33	0.47	0.63
346 (330-369)	**-**	0.29	0.42	0.57
400 (370-414)	**-**	0.26	0.37	0.50
440 (415-464)	**-**	0.24	0.33	0.44
500 (465-522)	**-**	0.20	0.30	0.40

1) Direct current in BSG operation

Key

I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier

I_B Accelerator current – brief inrush current

I_G Direct current with direct DC voltage supply

V_N Rated voltage (rated voltage range)

BMG61, BMG122 brake

	BMG61	BMG122
Motor size	250M...280S	
Max. braking torque [Nm]	600	1200
Braking power [W]	200	
Inrush current ratio I_B/I_H	6	

Rated voltage V_N **V_{AC}**	**BMG61/122** **I_H $[A_{AC}]$**
208 (194-217)	1.50
230 (218-243)	1.35
254 (244-273)	1.20
290 (274-306)	1.10
318 (307-343)	1.00
360 (344-379)	0.85
400 (380-431)	0.75
460 (432-484)	0.65
500 (485-500)	0.60

Key

I_B Accelerator current – brief inrush current

I_H Holding current r.m.s. value in the connecting harness to the SEW brake rectifier

V_N Rated voltage (rated voltage range)

9.6 Permitted ball bearing types

Motor type	Drive-end bearing (AC motor, brakemotor)			Non drive-end bearing (foot-mounted, flange-mounted, gearmotors)	
	Flange-mounted motor	Gearmotor	Foot-mounted motor	AC motor	Brake motor
DT56	-	6302-2Z-J	-	6001-2RS-J	6001-2RS-J
DFR63	6203-2Z-J	6303-2Z-J	-	6202-2Z-J	6202-2RS-J-C3
DT71 - DT80	6204-2Z-J	6303-2Z-J	6204-2Z-J	6203-2Z-J	6203-2RS-J-C3
DT(E)90 - DV(E)100		6306-2Z-J		6205-2Z-J	6205-2RS-J-C3
DV(E)112 - 132S	6208-2Z-J	6307-2Z-J	6208-2Z-J	6207-2Z-J	6207-2RS-J-C3
DV(E)132M - 160M	6309-2Z-J-C3			6209-2Z-J-C3	
DV(E)160L - 180L	6312-2Z-J-C3			6213-2Z-J-C3	
DV(E)200 - 225	6314-2Z-J-C3			6314-2Z-J-C3	
DV250-280	6316-2Z-J-C3			6315-2Z-J-C3	

9.7 Lubricant table for anti-friction bearings of SEW motors

The bearings are 2Z or 2RS closed bearings and cannot be regreased.

	Ambient temperature	Manufacturer	Type
Anti-friction bearing in motor	–20 °C ... +80 °C	Esso	Polyrex EM[1)]
	+20 °C ... +100 °C	Klüber	Barrierta L55/2[2)]
	–40 °C ... +60 °C	Klüber	Asonic GHY72[2)]

1) Mineral lubricant (= mineral-based anti-friction bearing grease)

2) Synthetic lubricant (= synthetic-based anti-friction bearing grease)

10 Appendix

10.1 Index of changes

The following additions and changes have been made since the last edition of the "DR/DV/DT/DTE/DVE AC Motors, CT/CV Asynchronous Servomotors" operating instructions (publication number: 10567917, Edition 02/2003):

General updates and revisions.

Motor design	• Nameplate, unit designation: Example has been changed.
Mechanical installation	• Before you start: Ambient temperature.
Electrical installation	• Using wiring diagrams. • Improving the grounding (EMC). • Ambient conditions during operation. • Connecting the motor: Tightening torques. • Connecting the motor via the plug connectors AB.., AD.., AM.., AS. • Optional equipment: VR forced cooling fan.
Inspection / maintenance	• Inspection / maintenance of the BMG61/122 brake.

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Germany			
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	East	SEW-EURODRIVE GmbH & Co KG Dänkritzer Weg 1 D-08393 Meerane (near Zwickau)	Tel. +49 3764 7606-0 Fax +49 3764 7606-30 sc-ost@sew-eurodrive.de
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	Drive Service Hotline / 24 Hour Service		+49 180 5 SEWHELP +49 180 5 7394357
	Additional addresses for service in Germany provided on request!		

France			
Production **Sales** **Service**	**Haguenau**	SEW-USOCOME 48-54, route de Soufflenheim B. P. 20185 F-67506 Haguenau Cedex	Tel. +33 3 88 73 67 00 Fax +33 3 88 73 66 00 http://www.usocome.com sew@usocome.com
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	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
	Additional addresses for service in France provided on request!		

Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
Assembly **Sales** **Service**	**Buenos Aires**	SEW EURODRIVE ARGENTINA S.A. Centro Industrial Garin, Lote 35 Ruta Panamericana Km 37,5 1619 Garin	Tel. +54 3327 4572-84 Fax +54 3327 4572-21 sewar@sew-eurodrive.com.ar

Australia			
Assembly **Sales** **Service**	**Melbourne**	SEW-EURODRIVE PTY. LTD. 27 Beverage Drive Tullamarine, Victoria 3043	Tel. +61 3 9933-1000 Fax +61 3 9933-1003 http://www.sew-eurodrive.com.au enquires@sew-eurodrive.com.au
	Sydney	SEW-EURODRIVE PTY. LTD. 9, Sleigh Place, Wetherill Park New South Wales, 2164	Tel. +61 2 9725-9900 Fax +61 2 9725-9905 enquires@sew-eurodrive.com.au

Austria			
Assembly **Sales** **Service**	**Wien**	SEW-EURODRIVE Ges.m.b.H. Richard-Strauss-Strasse 24 A-1230 Wien	Tel. +43 1 617 55 00-0 Fax +43 1 617 55 00-30 http://sew-eurodrive.at sew@sew-eurodrive.at

Belgium			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Brazil			
Production **Sales** **Service**	**Sao Paulo**	SEW-EURODRIVE Brasil Ltda. Avenida Amâncio Gaiolli, 50 Caixa Postal: 201-07111-970 Guarulhos/SP - Cep.: 07251-250	Tel. +55 11 6489-9133 Fax +55 11 6480-3328 http://www.sew.com.br sew@sew.com.br
	Additional addresses for service in Brazil provided on request!		

Bulgaria			
Sales	**Sofia**	BEVER-DRIVE GMBH Bogdanovetz Str.1 BG-1606 Sofia	Tel. +359 2 9532565 Fax +359 2 9549345 bever@mbox.infotel.bg

Cameroon			
Sales	**Douala**	Electro-Services Rue Drouot Akwa B.P. 2024 Douala	Tel. +237 4322-99 Fax +237 4277-03

Canada			
Assembly **Sales** **Service**	**Toronto**	SEW-EURODRIVE CO. OF CANADA LTD. 210 Walker Drive Bramalea, Ontario L6T3W1	Tel. +1 905 791-1553 Fax +1 905 791-2999 http://www.sew-eurodrive.ca l.reynolds@sew-eurodrive.ca
	Vancouver	SEW-EURODRIVE CO. OF CANADA LTD. 7188 Honeyman Street Delta. B.C. V4G 1 E2	Tel. +1 604 946-5535 Fax +1 604 946-2513 b.wake@sew-eurodrive.ca
	Montreal	SEW-EURODRIVE CO. OF CANADA LTD. 2555 Rue Leger Street LaSalle, Quebec H8N 2V9	Tel. +1 514 367-1124 Fax +1 514 367-3677 a.peluso@sew-eurodrive.ca
	Additional addresses for service in Canada provided on request!		

Chile			
Assembly **Sales** **Service**	**Santiago de Chile**	SEW-EURODRIVE CHILE LTDA. Las Encinas 1295 Parque Industrial Valle Grande LAMPA RCH-Santiago de Chile P.O. Box Casilla 23 Correo Quilicura - Santiago - Chile	Tel. +56 2 75770-00 Fax +56 2 75770-01 sewsales@entelchile.net

China			
Production **Assembly** **Sales** **Service**	**Tianjin**	SEW-EURODRIVE (Tianjin) Co., Ltd. No. 46, 7th Avenue, TEDA Tianjin 300457	Tel. +86 22 25322612 Fax +86 22 25322611 victor.zhang@sew-eurodrive.cn http://www.sew.com.cn

China			
Assembly **Sales** **Service**	**Suzhou**	SEW-EURODRIVE (Suzhou) Co., Ltd. 333, Suhong Middle Road Suzhou Industrial Park Jiangsu Province, 215021 P. R. China	Tel. +86 512 62581781 Fax +86 512 62581783 suzhou@sew.com.cn

Colombia			
Assembly **Sales** **Service**	**Bogotá**	SEW-EURODRIVE COLOMBIA LTDA. Calle 22 No. 132-60 Bodega 6, Manzana B Santafé de Bogotá	Tel. +57 1 54750-50 Fax +57 1 54750-44 sewcol@andinet.com

Croatia			
Sales **Service**	**Zagreb**	KOMPEKS d. o. o. PIT Erdödy 4 II HR 10 000 Zagreb	Tel. +385 1 4613-158 Fax +385 1 4613-158 kompeks@net.hr

Czech Republic			
Sales	**Praha**	SEW-EURODRIVE CZ S.R.O. Business Centrum Praha Luná 591 CZ-16000 Praha 6 - Vokovice	Tel. +420 220121234 + 220121236 Fax +420 220121237 http://www.sew-eurodrive.cz sew@sew-eurodrive.cz

Denmark			
Assembly **Sales** **Service**	**Kopenhagen**	SEW-EURODRIVEA/S Geminivej 28-30, P.O. Box 100 DK-2670 Greve	Tel. +45 43 9585-00 Fax +45 43 9585-09 http://www.sew-eurodrive.dk sew@sew-eurodrive.dk

Estonia			
Sales	**Tallin**	ALAS-KUUL AS Paldiski mnt.125 EE 0006 Tallin	Tel. +372 6593230 Fax +372 6593231 veiko.soots@alas-kuul.ee

Finland			
Assembly **Sales** **Service**	**Lahti**	SEW-EURODRIVE OY Vesimäentie 4 FIN-15860 Hollola 2	Tel. +358 3 589-300 Fax +358 3 7806-211 http://www.sew-eurodrive.fi sew@sew-eurodrive.fi

Gabon			
Sales	**Libreville**	Electro-Services B.P. 1889 Libreville	Tel. +241 7340-11 Fax +241 7340-12

Great Britain			
Assembly **Sales** **Service**	**Normanton**	SEW-EURODRIVE Ltd. Beckbridge Industrial Estate P.O. Box No.1 GB-Normanton, West- Yorkshire WF6 1QR	Tel. +44 1924 893-855 Fax +44 1924 893-702 http://www.sew-eurodrive.co.uk info@sew-eurodrive.co.uk

Greece			
Sales **Service**	**Athen**	Christ. Boznos & Son S.A. 12, Mavromichali Street P.O. Box 80136, GR-18545 Piraeus	Tel. +30 2 1042 251-34 Fax +30 2 1042 251-59 http://www.boznos.gr info@boznos.gr

Hong Kong			
Assembly **Sales** **Service**	**Hong Kong**	SEW-EURODRIVE LTD. Unit No. 801-806, 8th Floor Hong Leong Industrial Complex No. 4, Wang Kwong Road Kowloon, Hong Kong	Tel. +852 2 7960477 + 79604654 Fax +852 2 7959129 sew@sewhk.com

Hungary			
Sales **Service**	**Budapest**	SEW-EURODRIVE Kft. H-1037 Budapest Kunigunda u. 18	Tel. +36 1 437 06-58 Fax +36 1 437 06-50 office@sew-eurodrive.hu

India			
Assembly **Sales** **Service**	**Baroda**	SEW-EURODRIVE India Pvt. Ltd. Plot No. 4, Gidc Por Ramangamdi · Baroda - 391 243 Gujarat	Tel. +91 265 2831021 Fax +91 265 2831087 mdoffice@seweurodriveindia.com
Technical Offices	**Bangalore**	SEW-EURODRIVE India Private Limited 308, Prestige Centre Point 7, Edward Road Bangalore	Tel. +91 80 22266565 Fax +91 80 22266569 sewbangalore@sify.com
	Mumbai	SEW-EURODRIVE India Private Limited 312 A, 3rd Floor, Acme Plaza Andheri Kurla Road, Andheri (E) Mumbai	Tel. +91 22 28348440 Fax +91 22 28217858 sewmumbai@vsnl.net

Ireland			
Sales **Service**	**Dublin**	Alperton Engineering Ltd. 48 Moyle Road Dublin Industrial Estate Glasnevin, Dublin 11	Tel. +353 1 830-6277 Fax +353 1 830-6458

Israel			
Sales	**Tel-Aviv**	Liraz Handasa Ltd. Ahofer Str 34B / 228 58858 Holon	Tel. +972 3 5599511 Fax +972 3 5599512 lirazhandasa@barak-online.net

Italy			
Assembly **Sales** **Service**	**Milano**	SEW-EURODRIVE di R. Blickle & Co.s.a.s. Via Bernini,14 I-20020 Solaro (Milano)	Tel. +39 2 96 9801 Fax +39 2 96 799781 sewit@sew-eurodrive.it

Ivory Coast			
Sales	**Abidjan**	SICA Ste industrielle et commerciale pour l'Afrique 165, Bld de Marseille B.P. 2323, Abidjan 08	Tel. +225 2579-44 Fax +225 2584-36

Japan			
Assembly **Sales** **Service**	**Toyoda-cho**	SEW-EURODRIVE JAPAN CO., LTD 250-1, Shimoman-no, Toyoda-cho, Iwata gun Shizuoka prefecture, 438-0818	Tel. +81 538 373811 Fax +81 538 373814 sewjapan@sew-eurodrive.co.jp

Korea			
Assembly **Sales** **Service**	**Ansan-City**	SEW-EURODRIVE KOREA CO., LTD. B 601-4, Banweol Industrial Estate Unit 1048-4, Shingil-Dong Ansan 425-120	Tel. +82 31 492-8051 Fax +82 31 492-8056 master@sew-korea.co.kr

Latvia			
Sales	**Riga**	SIA Alas-Kuul Katlakalna 11C LV-1073 Riga	Tel. +371 7139386 Fax +371 7139386 info@alas-kuul.ee

Lebanon			
Sales	**Beirut**	Gabriel Acar & Fils sarl B. P. 80484 Bourj Hammoud, Beirut	Tel. +961 1 4947-86 +961 1 4982-72 +961 3 2745-39 Fax +961 1 4949-71 gacar@beirut.com

Lithuania			
Sales	**Alytus**	UAB Irseva Merkines g. 2A LT-4580 Alytus	Tel. +370 315 79204 Fax +370 315 79688 irmantas.irseva@one.lt

Luxembourg			
Assembly **Sales** **Service**	**Brüssel**	CARON-VECTOR S.A. Avenue Eiffel 5 B-1300 Wavre	Tel. +32 10 231-311 Fax +32 10 231-336 http://www.caron-vector.be info@caron-vector.be

Malaysia			
Assembly **Sales** **Service**	**Johore**	SEW-EURODRIVE SDN BHD No. 95, Jalan Seroja 39, Taman Johor Jaya 81000 Johor Bahru, Johor West Malaysia	Tel. +60 7 3549409 Fax +60 7 3541404 kchtan@pd.jaring.my

Morocco			
Sales	**Casablanca**	S. R. M. Société de Réalisations Mécaniques 5, rue Emir Abdelkader 05 Casablanca	Tel. +212 2 6186-69 + 6186-70 + 6186-71 Fax +212 2 6215-88 srm@marocnet.net.ma

Netherlands			
Assembly **Sales** **Service**	**Rotterdam**	VECTOR Aandrijftechniek B.V. Industrieweg 175 NL-3044 AS Rotterdam Postbus 10085 NL-3004 AB Rotterdam	Tel. +31 10 4463-700 Fax +31 10 4155-552 http://www.vector.nu info@vector.nu

New Zealand			
Assembly **Sales** **Service**	**Auckland**	SEW-EURODRIVE NEW ZEALAND LTD. P.O. Box 58-428 82 Greenmount drive East Tamaki Auckland	Tel. +64 9 2745627 Fax +64 9 2740165 sales@sew-eurodrive.co.nz
	Christchurch	SEW-EURODRIVE NEW ZEALAND LTD. 10 Settlers Crescent, Ferrymead Christchurch	Tel. +64 3 384-6251 Fax +64 3 384-6455 sales@sew-eurodrive.co.nz

Norway			
Assembly **Sales** **Service**	**Moss**	SEW-EURODRIVE A/S Solgaard skog 71 N-1599 Moss	Tel. +47 69 241-020 Fax +47 69 241-040 sew@sew-eurodrive.no

Peru			
Assembly **Sales** **Service**	**Lima**	SEW DEL PERU MOTORES REDUCTORES S.A.C. Los Calderos, 120-124 Urbanizacion Industrial Vulcano, ATE, Lima	Tel. +51 1 3495280 Fax +51 1 3493002 sewperu@sew-eurodrive.com.pe

Poland			
Assembly **Sales** **Service**	**Lodz**	SEW-EURODRIVE Polska Sp.z.o.o. ul. Techniczna 5 PL-92-518 Lodz	Tel. +48 42 67710-90 Fax +48 42 67710-99 http://www.sew-eurodrive.pl sew@sew-eurodrive.pl

Portugal			
Assembly **Sales** **Service**	**Coimbra**	SEW-EURODRIVE, LDA. Apartado 15 P-3050-901 Mealhada	Tel. +351 231 20 9670 Fax +351 231 20 3685 http://www.sew-eurodrive.pt infosew@sew-eurodrive.pt

Romania			
Sales **Service**	**Bucuresti**	Sialco Trading SRL str. Madrid nr.4 011785 Bucuresti	Tel. +40 21 230-1328 Fax +40 21 230-7170 sialco@sialco.ro

Russia			
Sales	**St. Petersburg**	ZAO SEW-EURODRIVE P.O. Box 263 RUS-195220 St. Petersburg	Tel. +7 812 5357142 +812 5350430 Fax +7 812 5352287 http://www.sew-eurodrive.ru sew@sew-eurodrive.ru

Senegal			
Sales	**Dakar**	SENEMECA Mécanique Générale Km 8, Route de Rufisque B.P. 3251, Dakar	Tel. +221 849 47-70 Fax +221 849 47-71 senemeca@sentoo.sn

Serbia and Montenegro			
Sales	**Beograd**	DIPAR d.o.o. Kajmakcalanska 54 SCG-11000 Beograd	Tel. +381 11 3046677 Fax +381 11 3809380 dipar@yubc.net

Singapore			
Assembly **Sales** **Service**	**Singapore**	SEW-EURODRIVE PTE. LTD. No 9, Tuas Drive 2 Jurong Industrial Estate Singapore 638644	Tel. +65 68621701 ... 1705 Fax +65 68612827 sales@sew-eurodrive.com.sg

Slovakia			
Sales	**Sered**	SEW-Eurodrive SK s.r.o. Trnavska 920 SK-926 01 Sered	Tel. +421 31 7891311 Fax +421 31 7891312 sew@sew-eurodrive.sk

Slovenia			
Sales **Service**	**Celje**	Pakman - Pogonska Tehnika d.o.o. UI. XIV. divizije 14 SLO – 3000 Celje	Tel. +386 3 490 83-20 Fax +386 3 490 83-21 pakman@siol.net

South Africa			
Assembly **Sales** **Service**	**Johannesburg**	SEW-EURODRIVE (PROPRIETARY) LIMITED Eurodrive House Cnr. Adcock Ingram and Aerodrome Roads Aeroton Ext. 2 Johannesburg 2013 P.O.Box 90004 Bertsham 2013	Tel. +27 11 248-7000 Fax +27 11 494-3104 dross@sew.co.za
	Capetown	SEW-EURODRIVE (PROPRIETARY) LIMITED Rainbow Park Cnr. Racecourse & Omuramba Road Montague Gardens Cape Town P.O.Box 36556 Chempet 7442 Cape Town	Tel. +27 21 552-9820 Fax +27 21 552-9830 Telex 576 062 dswanepoel@sew.co.za
	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za

Spain			
Assembly **Sales** **Service**	**Bilbao**	SEW-EURODRIVE ESPAÑA, S.L. Parque Tecnológico, Edificio, 302 E-48170 Zamudio (Vizcaya)	Tel. +34 9 4431 84-70 Fax +34 9 4431 84-71 sew.spain@sew-eurodrive.es

Sweden			
Assembly **Sales** **Service**	**Jönköping**	SEW-EURODRIVE AB Gnejsvägen 6-8 S-55303 Jönköping Box 3100 S-55003 Jönköping	Tel. +46 36 3442-00 Fax +46 36 3442-80 http://www.sew-eurodrive.se info@sew-eurodrive.se

Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 41717-17 Fax +41 61 41717-00 http://www.imhof-sew.ch info@imhof-sew.ch

Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.co.th

Tunisia			
Sales	**Tunis**	T. M.S. Technic Marketing Service 7, rue Ibn El Heithem Z.I. SMMT 2014 Mégrine Erriadh	Tel. +216 1 4340-64 + 1 4320-29 Fax +216 1 4329-76

Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri Sirketi Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 + 216 4419164 + 216 3838014 Fax +90 216 3055867 sew@sew-eurodrive.com.tr

USA			
Production **Assembly** **Sales** **Service**	**Greenville**	SEW-EURODRIVE INC. 1295 Old Spartanburg Highway P.O. Box 518 Lyman, S.C. 29365	Tel. +1 864 439-7537 Fax Sales +1 864 439-7830 Fax Manuf. +1 864 439-9948 Fax Ass. +1 864 439-0566 Telex 805 550 http://www.seweurodrive.com cslyman@seweurodrive.com
Assembly **Sales** **Service**	**San Francisco**	SEW-EURODRIVE INC. 30599 San Antonio St. Hayward, California 94544-7101	Tel. +1 510 487-3560 Fax +1 510 487-6381 cshayward@seweurodrive.com
	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
	Additional addresses for service in the USA provided on request!		

Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 sewventas@cantv.net sewfinanzas@cantv.net

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